Exhibit 36

DAILY FANTASY   SPORTSBOOK   **CASINO**   PICK6   DK HORSE   DK SHOP

Games   Promotions   Leaderboards   Casino Credits   Dynasty   VIP   **How To Play**

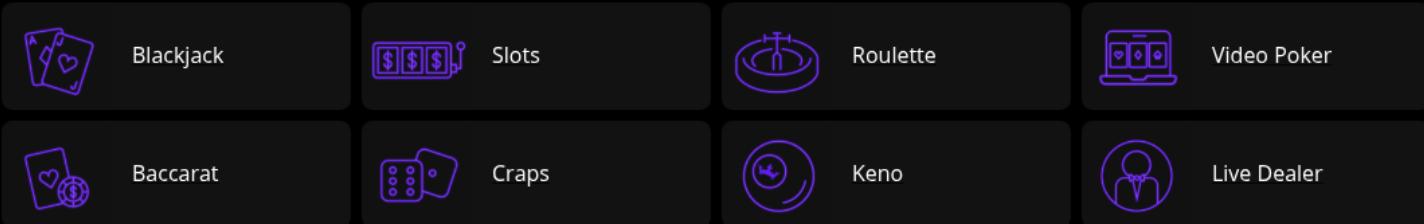**RG** Responsible Gaming

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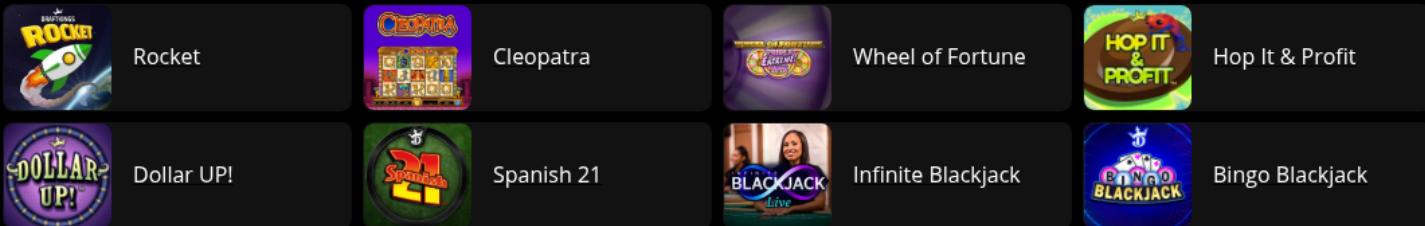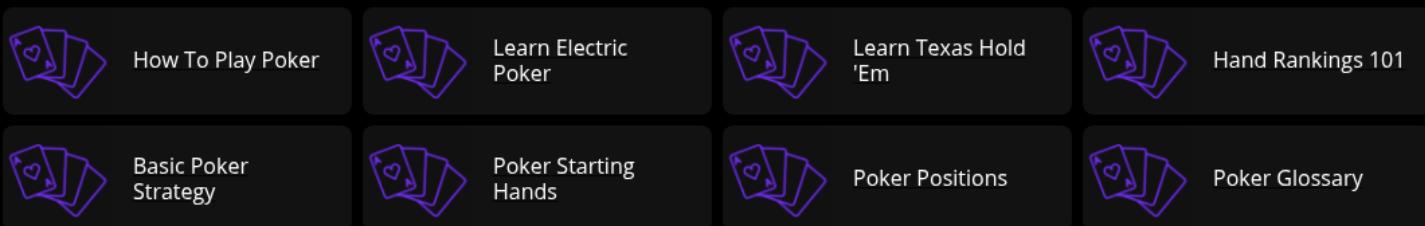
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INTEGRITY AND PROMOTIONS

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Create an account so you can

Find our latest offer

With welcome bonuses and

Have fun

You've read the casino game

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1

Sign Up

Create an account so you can start playing real money casino games on your phone, tablet, or computer.

2

Find our latest offer

With welcome bonuses and **daily promotions** from DraftKings Casino, you can win big right from the start.

3

Have fun

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Online Slots
Online Blackjack
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Exhibit 37

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DraftKings Help Center (US) > Fantasy Sports > Fantasy Sports Basics

←

Glossary of Fantasy Sports Terms (US)

Learn more with the glossary below to make understanding Fantasy Sports terms a breeze.

- For more information about each sport's contest formats, please review our Rules & Scoring.

#

50/50s   A contest type where players whose teams finish in the top half of entrants win cash. This contest type pays out entries that finish in the top half of the contest.

A

-

B

Bankroll   This is how much money you have available in your DraftKings account to enter contests.

Beginner Contests   Open to players who have not yet earned an experience badge and played under 50 contests.

Best Ball   Multi-week contests where players draft teams in a snake draft against other players in the contest

C

Casual Contest   Casual Contests are available to players who have not yet earned an experience badge.

Chalk   A term used to describe an athlete that is projected to have a high ownership percentage. A "chalk" play is an obvious, conventional pick because they are widely expected to perform well.

Classic   Players entering Classic Game Style will need to select a lineup of athletes that fit under a salary cap of $50,000. Each athlete is assigned a value, and players pick the athletes they want in their lineup.

D

Double Ups   A contest type where entries that finish in a winning position get back [cut off] fee. This contest type will pay out nearly half of the entries.

JUMP TO SECTION

Fantasy Sports Basics

How to Play- Fantasy Sports

Game Styles & Contest Types

Contest Rules & Scoring

Resolving Fantasy Sports Issues

Tickets

Leagues

💬   How can we help?

under a salary cap of $50,000. Each athlete is assigned a value, and players pick the athletes they want in their lineup.

D

Double Ups

A contest type where entries that finish in a winning position get back twice their entry fee. This contest type will pay out nearly half of the entries.

Doubtful (D)

An injury designation that indicates an athlete is most likely not going to play in their upcoming game.

E

-

F

Featured Contests

Popular contests that are available to participate in.

Flash Draft

A game type where players draft before or during a live game. Players draft over five (5) rounds and choose between individual athletes, athletes with multipliers, and athlete combos.

FPPG

An abbreviation of **Fantasy Points Per Game**. Fantasy Points Per Game is the average number of fantasy points a given athlete scores each game they play in the given game type.

Free Contests

Free to enter contests, where players can enter and compete without having to pay an entry fee.

G

GPP

An abbreviation of **Guaranteed Prize Pool**. Guaranteed Prize Pool refers to a tournament-style contest in which there is a set amount of money in the prize pool up for grabs, regardless of the number of entries.

Guaranteed (G)

These contests pay out the entire prize regardless of if the contest fills. This includes every guaranteed contest type not listed separately in the table.

Guaranteed Multipliers (2x-5x)

These contests pay out the entire prize regardless of whether the contest fills, but the payouts are structured such that all winners receive a set multiple of the entry fee.

H

Head to Head (H2H)

A contest type where you play against one opponent, and the winner takes it all.

I

Ineligble Entry

A Best Ball entry where the participant doesn't edit their pre-draft rankings, add a player to their queue during the draft, or make a manual draft pick du...

In Game Showdown   A game type where players draft a lineup for either the 2nd half or th...

How can we help?

I

Ineligble Entry	A Best Ball entry where the participant doesn't edit their pre-draft rankings, add a player to their queue during the draft, or make a manual draft pick during the draft.
In-Game Showdown	A game type where players draft a lineup for either the 2nd half or the 4th quarter of a game. Players can often draft or reserve before the game takes place.
Injured Reserve (IR)	An injury designation that indicates an athlete is injured for an extended period of time and is not expected to play in the upcoming game.

J

-

K

-

L

Leagues	A league is a group players can create where they and their friends can participate in private contests together.
Lock Time	The time in which a contest locks. This is typically the same start time as the first game/match in the contest.

M

Multi-entry(Ⓜ)	A contest type in which multiple entries are allowed. Each participant can submit as many entries as they'd like, up to the maximum amount as stated in the contest details.
Multipliers Contest	A contest type where players can win up to a 10x multiplier of their entry fee. This contest type will pay out the top finishing positions listed in the contest details.

N

Non-Guaranteed Standard	These contests must be filled in order to pay out their prize. Entry fees are automatically refunded if the contest doesn't fill.

O

OPRK	This is an abbreviation of **Opponent Rank**. Opponent Rank is the athlete's opponent's rank amongst all teams in the sport's league against a particular statistic. A low opponent rank indicates the opponent has performed well against that statistic.
Out (O)	An injury designation that indicates an athlete is not going to play in the game or will no longer continue playing in the game if the game has already started.

P

💬   How can we help?

opponent's rank amongst all teams in the sport's league against a particular statistic. A low opponent rank indicates the opponent has performed well against that statistic.

Out (O)

An injury designation that indicates an athlete is not going to play in the game or will no longer continue playing in the game if the game has already started.

P

PHR

This is an abbreviation of **Player Holes Remaining**. Player Holes Remaining refers to the number of golf holes remaining for athletes in your lineup.

PIR

This is an abbreviation of **Player Innings Remaining**. Player Innings Remaining refers to the number of innings remaining for athletes in your lineup.

Player Experience Badge

Player badges signify contest entry milestones for accomplished players. Anyone with an experience badge is ineligible for beginner or casual contests.

Player Pool

A group of athletes available to be drafted for a contest in a given slate of games.

PLR

This is an abbreviation of **Player Laps Remaining**. Player Laps Remaining refers to the number of laps remaining for athletes in your lineup.

PMR

This is an abbreviation of **Player Minutes Remaining**. Player Minutes Remaining is simply the total amount of game time left for athletes in your lineup.

Postponed Game (PPD)

This refers to when a game is not going to take place on the originally scheduled day. Athletes in a postponed game are not going to score any fantasy points in that specific contest if the contest duration is only that day.

Q

Questionable (Q)

An injury designation that indicates an athlete may or may not play in their upcoming game.

R

-

S

Salary

In our salary cap contests, you have $50,000 to compile your roster. Each athlete listed in the Player Pool has an assigned salary. An athlete's salary will not change for a given contest, but may change in future contests based on their performance.

Satellites and

Qualifiers Contests

Contest types where players win tickets that can be used for entry in higher-stake contests.

Series Contests

A game type where players draft athletes who play in multiple games. Fantasy Points are cumulative across all games in the contest.

Single Stat

A contest where participants choose three players based on a single

... How can we help?

Series Contests	A game type where players draft athletes who play in multiple games. Fantasy Points are cumulative across all games in the contest.
Single Stat	A contest where participants choose three players based on a single stat category such as points scored, assists, rebounds, or passing yards. Points are accumulated based on how well the players perform in that stat category.
Showdown	A game type that only spans one game. Players would need to fill their lineup with athletes from both teams playing within one game but also stay under the salary cap of $50,000.
Slate	A set of games grouped for a specific contest on DraftKings, usually starting around the same time (like Main Classic Slate or Turbo Slate).
Slow Draft	A Snake Draft where users are given up to 8 hours per pick to draft their players for these contests.
Snake Draft	Snake draft contests are contests where players draft athletes one by one over a set number of rounds. The draft order is determined randomly, and all fantasy players draft athletes in each round. Once the first round is complete, the user who picked last then picks first in the second round. In other words, the draft snakes back on itself.
Start Time	The time a game/match begins.

T

Tiers	A game type where players fill their lineup by drafting athletes from different pre-selected tiers.
Tournaments	Small and large field contests with huge prizes.

U

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V

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W

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X

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Y

Tournaments   Small and large field contests with huge prizes.

U

-

V

-

W

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X

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Y

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Z

-

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Exhibit 38

CASINO EDUCATION HUB

HOW TO PLAY BLACKJACK

There aren't many card games easier to learn than blackjack, and it's not just the game's simplicity that makes it popular. Unlike some casino games, blackjack offers you control over the outcome that brings strategy into the mix. In fact, when you play hands according to an ideal mathematical strategy, your odds can be nearly equal to the house.

With simple rules and good odds, it's no surprise blackjack is the most widely played casino table game in the world. DraftKings offers online blackjack, so you can get in on all the fun of the game of 21 whenever and wherever you want.

Get into the action, start playing today!

Sign Up

How Blackjack Works

Blackjack rules are easy to learn. Even if you're a total beginner, you'll be ready to join a table before you can say, "hit me!"

Objective in Blackjack

Blackjack, often referred to as "Twenty-One," has a simple goal. You want to finish higher than the dealer without going over twenty-one. There are three ways to win:

- Finish with a hand total higher than the dealer's hand total.
- If the dealer draws a total that goes above twenty-one. However, if you go over twenty-one as well, you don't win.

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- Finish with a hand total higher than the dealer's hand total.
- If the dealer draws a total that goes above twenty-one. However, if you go over twenty-one as well, you don't win.
- If you're dealt twenty-one on your first two cards, also known as a blackjack, but the dealer isn't dealt twenty-one on their first two cards.

How to bet in blackjack

Before the next hand starts, everyone places their bet. Bets pay 1:1, and you must bet at least the table minimum. DraftKings has tables with one-dollar minimums, which allows you to hone your skills without breaking the bank.

How to deal blackjack

Dealing blackjack is nice and straightforward. A card is dealt to each player face-up, then to the dealer face-up. A second card is dealt face-up to each player. This time, the card to the dealer is placed face down. You may not want to play against a dealer for a home game. In this case, take turns dealing, and deal everyone's cards face up.

Card values in blackjack

Cards two through ten are all worth their face value. Face cards (jacks, queens, and kings) are worth ten. Aces are worth one or eleven, whichever gives you a better hand. If you use your ace as an eleven, your hand is called soft. So an ace and a six would give you a soft seventeen.

How a hand works in blackjack

Every player has two cards face up, and the dealer has one card face down and one face up. Pay particular attention to the dealer's face-up card because a lot of your strategy will depend on what it is.

You can hit or stay when it's your turn to play. Hit means you want another card. Staying means you're going to try to beat the dealer with what you have. You can hit as many times as you'd like, but remember not to go over twenty-one. If you do, it's called busting, and you automatically lose—even if the dealer busts, too. When you're happy with your hand and stay, the dealer reveals their face-down card. If they have seventeen or higher, they're required to stay. If the dealer is lower than seventeen, they have to hit. Many casinos will hit a soft seventeen. However, at DraftKings, the dealer stays, which is advantageous to the player.

If the dealer stays and your total is higher, congratulations—you win! If the dealer busts and you don't, congratulations—you win! However, if the dealer scores higher than your hand without busting, you lose.

Get into the action, start playing today!

Sign Up

There are many ways to win at blackjack on a given day. However, to have the best chance each time you play, you can incorporate some fairly simple strategies to increase your odds. Check out our guide to blackjack strategy for a more in-depth look at strategy, including basic blackjack strategy, which is the statistically best way to play every hand.

Blackjack Strategy Chart

		Dealer's Up Card									
		2	3	4	5	6	7	8	9	10	A
Your Cards (Hard)	4	H	H	H	H	H	H	H	H	H	H
	5	H	H	H	H	H	H	H	H	H	H
	6	H	H	H	H	H	H	H	H	H	H
	7	H	H	H	H	H	H	H	H	H	H
	8	H	H	H	H	H	H	H	H	H	H
	9	H	D	D	D	D	H	H	H	H	H
	10	D	D	D	D	D	D	D	D	H	H
	11	D	D	D	D	D	D	D	D	D	D
	12	H	H	S	S	S	H	H	H	H	H
	13	S	S	S	S	S	H	H	H	H	H
	14	S	S	S	S	S	H	H	H	H	H
	15	S	S	S	S	S	H	H	H	H	H
	16	S	S	S	S	S	H	H	H	H	H
	17	S	S	S	S	S	S	S	S	S	S
	18	S	S	S	S	S	S	S	S	S	S
	19	S	S	S	S	S	S	S	S	S	S
	20	S	S	S	S	S	S	S	S	S	S

		Dealer's Up Card									
		2	3	4	5	6	7	8	9	10	A
Your Cards (Hard)	A , 2	H	H	H	D	D	H	H	H	H	H
	A , 3	H	H	H	D	D	H	H	H	H	H
	A , 4	H	H	D	D	D	H	H	H	H	H
	A , 5	H	H	D	D	D	H	H	H	H	H
	A , 6	H	D	D	D	D	S	H	H	H	H
	A , 7	S	D/S	D/S	D/S	D/S	S	S	H	H	H
	A , 8	S	S	S	S	S	S	S	S	S	S
	A , 9	S	S	S	S	S	S	S	S	S	S

		Dealer's Up Card									
		2	3	4	5	6	7	8	9	10	A
Your Cards (Hard)	2 - 2	H	P	P	P	P	P	H	H	H	H
	3 - 3	H	H	P	P	P	P	H	H	H	H
	4 - 4	H	H	H	H	H	H	H	H	H	H
	5 - 5	D	D	D	D	D	D	D	D	H	H
	6 - 6	P	P	P	P	P	H	H	H	H	H
	7 - 7	P	P	P	P	P	P	H	H	H	H
	8 - 8	P	P	P	P	P	P	P	P	P	P
	9 - 9	P	P	P	P	P	S	P	P	S	S
	10 - 10	S	S	S	S	S	S	S	S	S	S
	A - A	P	P	P	P	P	P	P	P	P	P

H	Hit (Draw a card)
S	Stand (Don't draw another card)
D	Double (If possible, otherwise Hit)
P	Split

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S	Stand (Don't draw another card)
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Blackjack Strategy

When to hit in blackjack

It can take time to determine when to hit, especially with a mediocre hand. If you hate risk, you might find it hard to hit when you should. When it comes to taking a new card, some guidelines can help you know when to take a chance and when to play it safe. Remember, always consider the dealer's card. If it's likely that the dealer has a good hand, you should play more aggressively. If the dealer is likely to have a bad hand or bust, you can play things safer. Here are some basic rules for hitting in blackjack:

- If your cards add up to eleven or less, you should hit. It's impossible to bust at this stage, so you're improving your hand without risk.
- Be more aggressive when the dealer shows a seven or higher. It's not a bad idea to hit with anything worse than seventeen.

When to stand in blackjack

If you have a strong hand, say twenty, standing is an easy choice. However, with mediocre hands, things can get tricky. If you like a level of risk, you may find it hard to stand when you should. Here are some guidelines to make your decision easier:

- If the dealer is showing a five or six, you should probably stand. These are the worst cards for a dealer, and they'll likely bust. But you can't win if you go over twenty-one, so play it cautiously. If you have anything twelve or over, it's a good idea to stay.
- Strongly consider standing with seventeen or higher, even if the dealer is showing an ace. The chances of hitting a four or lower will always be worse than your chances against the dealer.

When to split in blackjack

If you're dealt a pair for your starting cards, like two fours, you can split them. To split, you have to place a second bet down at the same value as your original bet. This turns each card into its own individual hand. You play one hand, hitting until you bust or decide to stay, and then move onto the

chances of hitting a four or lower will always be worse than your chances against the dealer.

When to split in blackjack

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There are two times you should split a pair, no matter what the dealer has:

- Always, always, always split aces or eights. Why? Aces give you two or a soft twelve, both of which are unlikely to yield a strong hand. But when you split, you have two separate power cards. Eights, however, give you sixteen, which is the worst hand you can start with. By splitting, you have two hands and two chances at making a better hand than sixteen.
- Consider splitting when the dealer has a bad hand. Nines, sevens, sixes, threes, and twos are worth splitting if the dealer shows between a two and a six.

When to double down in blackjack

Like splitting, doubling down is an opportunity to increase your payouts and odds in blackjack. You're allowed to double your bet, or "double down," after seeing your first two cards. The catch? You can only take one more card. So if you have a total of seven, double down, then hit a two, you're stuck at nine.

Doubling down may be an opportunity to win larger amounts, but if done recklessly, it can also result in big losses. So when should you double down? Well, like all blackjack hands, you need to take your cards and the dealer's card into account. If the dealer shows a strong card, like a ten or an ace, don't risk a double down. However, a double down is a good idea if the dealer's card is weaker than that and you have a ten or eleven total. Why with a ten or eleven? Because any face card will give you twenty or twenty-one. The worse the dealer's starting card, the more lenient you can be with a double down.

Insurance

What is insurance in blackjack? Insurance protects you against the dealer having blackjack, and you can buy insurance when the dealer's face-up card is an ace. Insurance is offered before the dealer checks their face-down card, and it's usually half the amount of your initial bet—so if you lose your initial bet to blackjack, you essentially break even.

The odds are slightly against you if you take insurance. You may get lucky this time, but if you play long enough, you'll lose more money buying insurance than you win.

Other Blackjack Tips

Now that you know how to play blackjack, here are some additional tips to increase your chances:

Set a limit

Before you begin playing, set an amount you're going to play with (and are willing to lose). Stick to this number, reminding yourself you picked it when your emotions weren't running high.

Keep your betting consistent

There are plenty of betting strategies available. Some include doubling your bet each time you lose, so you're back to even when you win. However, you need to be willing to lose a lot of money if you hit a bad streak. You'll extend your play and avoid big losses by keeping your bets consistent. If you feel inclined to increase bets as you play, consider only increasing bets after wins, so you're playing with the house's money.

Stick with your strategy

When to double down in blackjack

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Stick with your strategy

After losses, it's only natural to want to win your money back. But don't force the issue. When you're down, resist the urge to increase bet size or play more aggressively.

Avoid alcohol

Alcohol lowers your inhibitions, and inhibitions help you stick to your strategy. Avoid drinking while playing to give yourself the best chance of playing smart.

Playing Blackjack at DraftKings

Play blackjack when and where you want with online blackjack at DraftKings. Classic blackjack gets a new look with various themes, like sports or holidays, to keep the game fresh. Want to take your game a step further? Find blackjack variations with side bets, such as "four 20s blackjack," which lets you play four hands and bet on twenties coming up on any of them.

At DraftKings online casino, you can enjoy other classic casino games like online slots, online roulette,

Exhibit 39

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BLACKJACK STRATEGY: MASTERING THE GAME

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Blackjack Card Value

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Roulette Strategy

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Craps Strategy

Baccarat Strategy

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Welcome to DraftKings, your ultimate resource for blackjack strategy! Whether you're a seasoned player or just starting, understanding the nuances of this popular casino game is key. This guide will walk you through the essential elements of mastering blackjack strategy, helping elevate your gameplay experience.

Understanding Blackjack Basics

Blackjack is a beloved casino game renowned for its strategic depth and exhilarating gameplay. No matter your experience level, grasping the fundamentals of blackjack is crucial for a successful gaming session. This section will introduce you to blackjack rules, how to play, and some essential terminology to get you started.

Rules of Blackjack: The main goal is to have a hand value closer to 21 than the dealer's without exceeding 21. Players receive two cards at the start, while the dealer gets one card facing up and one facing down. Players can choose to hit (draw additional cards), stand (keep their current hand), double down (double their bet and receive one more card), or split (if they have two identical cards, they can split them into separate hands).

How to Play Blackjack: Place your bet within the table's limits. After bets are placed, the dealer deals the cards. Each card's value is determined by its face value, except for face cards (King, Queen, Jack), which are worth 10, and the Ace, which can be valued as 1 or 11. The objective is to achieve a total value closer to 21 than the dealer without going over. Click here *for more information on how to play blackjack.*

Basic Blackjack Terminology: Knowing standard terms can enhance your blackjack experience. 'Hit' means to take another card, 'stand' means to keep your current hand, 'bust' refers to exceeding 21, and 'push' occurs when the player and dealer have the exact total, resulting in a tie. Other terms include 'surrender,' 'insurance,' and 'blackjack,' which is achieved when your initial two cards total 21.

When it comes to strategy, you'll often hear terms like a 'hard hand' and 'soft hand.' A soft hand has an ace that can be counted as either one or 11, whereas a hard hand does not have an ace or has an ace that must be counted as one.

Developing Your Blackjack Strategy

Having a well-thought-out strategy is essential for improving your odds in blackjack. This section covers the basics of blackjack strategy, advanced techniques, and tips for refining your approach.

Blackjack Basic Strategy

Understanding basic strategy is a cornerstone of blackjack. It involves making decisions based on your cards and the dealer's upcard. Basic strategy charts guide when to hit, stand, double down, or split in various scenarios. Following a basic blackjack strategy helps minimize the house edge and optimize your gameplay. It's the ideal way of playing every possible hand based on mathematics. The great thing about it is that it takes the emotion out of your choices. Should you split fours when the dealer's showing a three? (Nope). Should you double down with a soft fifteen against a five? (Yes). Every choice will be based on the numbers, making your chances of winning as high as possible.

Advanced Blackjack Strategies

Advanced strategies like card counting, shuffle tracking, and hole carding can benefit experienced players. These methods require significant skill and practice. While card counting is not illegal, casinos may take measures to prevent its use.

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Tips for Improving Your Strategy

Consider these blackjack tips to enhance your strategy:

- Manage your bankroll effectively to avoid overspending.
- Practice playing blackjack online or with friends to hone your skills.
- Always pay attention to the dealer's upcard and adjust your strategy accordingly.
- Avoid taking insurance bets, as they generally have a high house edge.
- Know when to walk away and set limits on your playing time.

Incorporating these blackjack tips can elevate your strategy and improve your overall gameplay.

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For more specialized situations, here are two more tables:

The "Soft" table is for when you're dealt an Ace. It is only used when you can still treat the Ace worth one or eleven. Once your other cards reach a total of eleven or higher--since making the Ace eleven would cause you to bust—it's assumed the Ace is worth one. That's a "hard" hand, for which you can return to the first table.

Soft	2	3	4	5	6	7	8	9	10	A
13	H	H	H	D	D	H	H	H	H	H
14	H	H	H	D	D	H	H	H	H	H
15	H	H	D	D	D	H	H	H	H	H
16	H	H	D	D	D	H	H	H	H	H
17	H	D	D	D	D	H	H	H	H	H
18	S	D	D	D	D	S	S	H	H	H
19	S	S	S	S	S	S	S	S	S	S
20	S	S	S	S	S	S	S	S	S	S
21	S	S	S	S	S	S	S	S	S	S

With the "Pair" table, when you start with two cards of the same value (like two 3s, two 8s, or two jacks), you can split them into two beginning hands. The P means "split." You must equal the bet on your initial hand when you choose to. After that decision, you'll get another card for each hand and can return to the first table. Together, the three tables are sometimes referred to as a blackjack strategy calculator.

Pair	2	3	4	5	6	7	8	9	10	A
2,2	P	P	P	P	P	P	H	H	H	H
3,3	P	P	P	P	P	P	H	H	H	H
4,4	H	H	H	P	P	H	H	H	H	H
5,5	D	D	D	D	D	D	D	D	H	H
6,6	P	P	P	P	P	H	H	H	H	H
7,7	P	P	P	P	P	P	H	H	H	H
8,8	P	P	P	P	P	P	P	P	P	P
9,9	P	P	P	P	P	S	P	P	S	S
10,10	S	S	S	S	S	S	S	S	S	S
A,A	P	P	P	P	P	P	P	P	P	P

Top Basic Blackjack Strategies to Easily Follow

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| A,A | P | P | P | P | P | P | P | P | P | P |

Ten Basic Blackjack Strategies to Easily Follow

Because those charts have a lot of data and can be hard to follow, we're giving you relevant, simple rules to stick to. These combine to offer the best blackjack strategy according to the math:

1. Always double down on 11 unless the dealer shows an Ace.

2. When the dealer's upcard is 2-9, always double down on an initial score of ten.

3. When the dealer's upcard is a 5 or 6, always double down on a soft 13-18.

4. Always split Aces and always split eights.

5. Never split a pair of fives or tens.

6. Never make the insurance bet

7. If the dealer has a 2 or 3 upcard, always hit on a hard 12.

8. If the dealer shows 9,10, or Ace, always hit A-7.

9. When you are dealt a pair of 2s or 3s, hit against a dealer's 2 or 3.

10. Always stand with a pair of 9s when the dealer shows 7.

Maximizing Your Outcomes

A solid strategy is crucial for optimizing blackjack outcomes. This section covers essential aspects such as bankroll management, effective betting strategies, and leveraging promotions.

Bankroll management is fundamental in any gambling game, including blackjack. It involves setting a budget for your sessions and sticking to it. Properly managing your bankroll ensures you don't overspend and allows you to play for extended periods. Always bet within your means.

Effective betting strategies can also enhance your results. One popular approach is the Martingale system, where you double your bet after each loss and return to your original bet after a win. This strategy can help you recover losses and potentially gain a profit. However, no betting strategy guarantees success, so play responsibly.

Taking advantage of promotions can provide an edge at the blackjack tables. DraftKings offers various promotions and bonuses, such as deposit matches or free bet credits, which can give you additional funds to play with. Keep an eye out for these offers to boost your gameplay.

Remember, while a robust strategy can improve your chances, it's essential to approach the game responsibly. Set limits, play within your means, and prioritize enjoyment over outcomes. Good luck!

Different Variations of Blackjack

Blackjack comes in several variations, each with unique rules and strategies. Understanding these differences is crucial to developing an effective strategy. Here are key topics to consider:

4-Deck to 8-Deck Strategies: The number of decks used in a game can significantly impact your strategy. Generally, more decks increase the house's edge. Adjust your strategy accordingly, considering the increased likelihood of certain cards being dealt.

Understanding Rule Variations: Different online blackjack games may have varying rules for blackjack, affecting the game's overall odds and strategy. For example, some allow the dealer to hit on a soft 17, while others require the dealer to stand. Understanding these variations and how they impact your gameplay is essential.

Effect of Rule Variations on House Edge: Rule variations can directly affect the house edge. Rules that allow players to double down on any two cards or offer early surrender can decrease the house edge, improving your chances. Conversely, rules like the dealer hitting on a soft 17 or restrictions on doubling down can increase the house edge. Be

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- Blackjack Card Value
- Slots Strategy
- Roulette Strategy
- American vs. European Roulette
- Craps Strategy
- Baccarat Strategy
- Video Poker Strategy
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- Dollar UP!
- Bingo Blackjack
- Multihand Blackjack
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- Spanish 21
- Infinite Blackjack
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Effect of Rule Variations on House Edge: Rule variations can directly affect the house edge. Rules that allow players to double down on any two cards or offer early surrender can decrease the house edge, improving your chances. Conversely, rules like the dealer hitting on a soft 17 or restrictions on doubling down can increase the house edge. Be aware of these variations and choose games with favorable rules to maximize your success.

Understanding different blackjack variations, including strategies for different deck sizes and rule effects on the house edge, allows for more informed gameplay decisions. Always practice responsible gambling and enjoy the excitement of blackjack at DraftKings.

Tips for a Successful Blackjack Session

Adopting a solid strategy can significantly enhance your blackjack session. Here are valuable tips for a successful experience:

Playing with confidence: Confidence is crucial in blackjack. Trust your abilities and the strategies you've learned. Make decisions confidently and avoid second-guessing yourself. Blackjack is a game of skill, and playing confidently can lead to better outcomes.

Avoid common mistakes: Be aware of common mistakes hindering your session. One standard error is failing to follow the basic strategy. Familiarize yourself with the basic blackjack strategy chart and adhere to it.

Keep bets consistent: The best betting strategy will almost always be to keep your bet value consistent. Don't think you're due for a win when you're having a bad run. Odds don't care about your streak. It's the same with winning streaks. Just because you feel hot doesn't change your odds for the next hand.

Progressive betting increases, where you double your bet each time you lose, can get expensive fast. The idea is one win will bring you back to even. However, you must be willing to lose a significant amount. if you hit a bad streak. Some people try progressive betting increases only after a win, so they're only losing money they've won. This is a safer blackjack table strategy, but it can get expensive when splitting or doubting down.

Manage emotions at the table: Emotions can run high in blackjack, especially when money is involved. It's crucial to keep your emotions in check and avoid impulsive decisions. If you feel frustrated or angry, take a break and step away from the table. Remember, blackjack is a game of probabilities, and each hand is independent of the previous one. Stay calm and focused, and make rational decisions.

Minimize alcohol consumption: In-person or online, alcohol drops your inhibitions and increases the chance of risky play and betting. Blackjack is excellent because it involves strategy. So, increase your odds by avoiding alcohol. It may be easier playing online where you aren't being offered drinks.

Don't be pressured: Once your strategy is established, don't let other players pressure you into making a choice. This sadly happens often. Ignore them and stick with your game. One of the perks of an online casino like DraftKings is you can avoid these interactions.

Set an amount and stick with it: Decide the amount you're willing to lose in advance. No matter how your play progresses, stick with this amount. It's easy to get swept up with emotions when you gamble, making you take chances at the moment. This is why it's essential to determine your limit in advance and stick with it.

Following these blackjack tips can enhance your experience and improve your chances of success.

Stick to a Strategy & Play Smart

The strategy we've laid out will give you the best odds of winning. Basic strategy can seem complicated to memorize and overwhelming at first. Still, there's good news—whether you're playing blackjack at a regular casino or online at the DraftKings casino, you can have a strategy card printed out for reference.

With DraftKings, you can play blackjack whenever and wherever you like. You'll find various themes, such as sports, retro, or your favorite holidays. Start as low as $1 per hand. Play variations with side bets if you want to take your blackjack further. "Four 20s blackjack" lets you play four hands and bet on twenties coming up on any of them. Practice responsible gambling and enjoy the thrill of the game responsibly.

Practice responsible gambling and enjoy the thrill of the game responsibly.

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Frequently Asked Questions

When should you hit in blackjack?

The level of risk you take with your hitting should get more aggressive when the dealer has a likelihood of a good hand. Consider a few basic rules on when to hit in blackjack:

- It's a good idea to hit when your cards add up to 11 or less. It is impossible at this point to bust, so you have nothing to lose when hitting.

- If the dealer shows a seven or higher, consider getting aggressive. As long as you have anything worse than 17, think about hitting.

When should you stand?

Standing can be one of the most complex parts of blackjack, depending on your willingness to take risks. However, there are some statistically bright moments when you absolutely should stand.

- If your hand is a hard 17 or higher, it's a good time to stand. It will be unlikely to get the small card you need if you hit in this circumstance. The odds are best for you if you stand, even if the dealer shows a face card or Ace.

- Stand when you have a hard 12 or higher, and the dealer shows a five or a six. A six is the worst card for a dealer since the likelihood of them busting is highest. No matter what you have, if it's over 12, standing will be your best chance of coming out ahead.

What is Insurance in Blackjack?

Insurance is an optional side bet that pays out if the dealer's initial two cards total 21.

Statistically speaking, you should never buy insurance. The reason is simple. The odds are slightly against you, meaning if you play an infinite number of hands, you will lose more money paying for insurance than you will win back.

What is Doubling Down?

Secondary bets are where players increase their payouts and odds of winning at blackjack. One of these bets is doubling down. You can double down on any two initial cards you receive by doubling your initial bet. You then get one more card, but only one. If you win the hand, you win twice your original bet.

When to double down in blackjack? Consider doubling down whenever you're in a position where one more card may greatly help you. For instance, if you have two cards equaling 10 or 11, a face card or 10 will bring your total to 20 or 21. Likewise, if the dealer has a lousy card showing, like a six, this increases your odds of winning and makes a double-down more strategic.

As you're starting, consider doubling down whenever you have 11, unless the dealer has an Ace, and whenever you have 10, unless the dealer has a 10 or an Ace. You could also double down with a nine when the dealer has a lousy starting card, like a six, five, four, or three.

What is Splitting?

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starting card, like a six, five, four, or three.

What is Splitting?

Splitting is an option whenever your starting two cards are a pair, like two nines or two threes. When you split, you place a second bet of the same value as your original, turning each card into its hand. You then play each card as a separate hand, hitting until you want to stay or you bust.

When should you split in blackjack? You may have heard the saying, "Always split Aces and eights." These are good words to live by. Also, consider splitting nines, sevens, sixes, threes, and twos if the dealer shows between a two or a six.

How Does Strategy Change with Multi-Deck Games?

More decks turn the odds slightly more in favor of the house. However, these changes are minimal, and for most players, a six-deck blackjack strategy should be the same as a single-deck blackjack strategy. A single-deck game has the best odds for a player if all else is equal. However, most of the time, a single-deck game will have different payout structures, like 6:5 payouts for a blackjack rather than 3:2. These payout variations hurt the player enough that any advantages of a single deck are wiped out and should be avoided. Based on the odds, you should play only a few hands differently with a single-deck blackjack strategy.

Hard 11 vs. an Ace

With a single deck, you should double down in this situation. If you're playing multiple decks, just hit here.

Hard nine vs. a two

With a single deck, double down against a two. With multiple decks, hit.

Hard eight against a five or six

With a single deck, double down against a five or six. For a multi-deck game, just hit. The exception is with a 4-4. No matter the number of decks, you'll want to split fours against a five or six.

What's Solved Games?

Blackjack is what we call a solved game. According to the math, there's always a clear choice that offers the best mathematical chances of paying off. That brings us to the chart.

Again, this can look intimidating, but it's a simple way to ensure you can make the best mathematical choice. See the numbers down the left side? Those are possible totals you can have when adding your first two cards. The numbers across the top? The dealer only shows one card to start, so those are the cards the dealer could be showing. Once you've added your first two cards and seen the dealer's up card, if you want to play by the math, find the symbol where the two intersect:

- H stands for "hit" or, take another card.

- S means "stand" or stay with what you have.

Player's Hand	2	3	4	5	6	7	8	9	10	A
5	H	H	H	H	H	H	H	H	H	H
6	H	H	H	H	H	H	H	H	H	H
7	H	H	H	H	H	H	H	H	H	H
8	H	H	H	H	H	H	H	H	H	H
9	H	D	D	D	D	H	H	H	H	H
10	D	D	D	D	D	D	D	D	H	H
11	D	D	D	D	D	D	D	D	D	H
12	H	H	S	S	S	H	H	H	H	H
13	S	S	S	S	S	H	H	H	H	H
14	S	S	S	S	S	H	H	H	H	H
15	S	S	S	S	S	H	H	H	H	H
16	S	S	S	S	S	H	H	H	H	H
17	S	S	S	S	S	S	S	S	S	S
18	S	S	S	S	S	S	S	S	S	S
19	S	S	S	S	S	S	S	S	S	S
20	S	S	S	S	S	S	S	S	S	S
21	S	S	S	S	S	S	S	S	S	S

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card.

- S means "stand" or stay with what you have.

- D means "double down." That means you're doubling your bet and agreeing to take just one card, a wager you only want to make when you have a strong mathematical edge.

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Page 8 of 8

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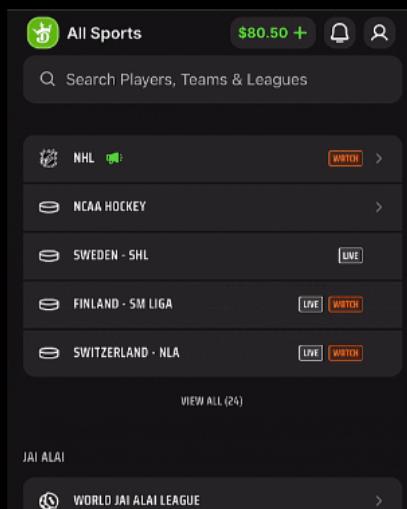# How do I place a bet on DraftKings Sportsbook? (US)

Overview

- To place a bet, find the event and outcome you would like to bet on and click to add it to your bet slip. The green numbers associated with each outcome are the odds, which determine the potential payout. You can add up to 12 picks to your bet slip at any given time.

- To view your bet slip, tap the center button on the app or look to the right-hand side of your screen on the web. Here you can see all of the picks you have selected that are waiting to be placed.

- Once in the bet slip, you can toggle between Singles, Parlays, and Round Robins (visit our wagers page here to learn more about the kinds of bet types offered on DraftKings). Enter the amount you would like to wager and you will see the potential payout calculated.

- Once you confirm your picks and wager amount, select '**PLACE BET**' to lock in your bet. You will see a receipt for all of the bets you place. You can view all of your receipts and track the outcomes by visiting 'My Bets.'

Placing a bet on the DraftKings Sportsbook App

1. Log in to your DraftKings Sportsbook account.

2. Select the event you would like to wager on via the Home Tab or through the Search Bar.

3. Once you have found an even, slect the outcome you would like to bet on and add it to your bet slip.

4. Review if you have any available rewards by tapping the *Moneybag* symbol in the top right corner of the bet slip.

5. Enter the amount you'd like to wager and you will see the potential payout calculated.

6. Once you have confirmed your selection and wager amount, select 'PLACE BET'.

7. You can view your placed bets and track their outcomes by visiting 'My Bets'.

A visual representation of this process can be found below

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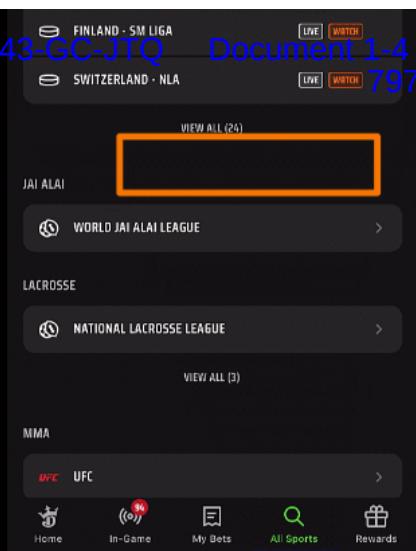
Placing a bet on DraftKings Sportsbook on your Desktop

1. Log in to your DraftKings Sportsbook account.

2. Select the event you would like to wager on via the Leagues pages on the left rail.

3. Once you have found an event, select the outcome you would like to bet on and click it to add it to your bet slip.

4. Review if you have any available rewards by clicking the **Bonus Available** dropdown in the bet slip.

5. Enter the amount you'd like to wager and you will see the potential payout calculated.

6. Once you have confirmed your selection and wager amount, select **PLACE BET**.

7. You can view your placed bets and track their outcomes by visiting 'My Bets'.

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3. Once you have found an event, select the outcome you would like to bet on and click it to add it to your bet slip.

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Exhibit 41

FANTASY   SPORTSBOOK   CASINO   PICK6   REIGNMAKERS   DK HORSE   ☼   🔍   English (US) ⌄   Sign in

DraftKings Help Center (US) > Pick6 > How to Play - Pick6

←

How do I make Picks? (US)

Making your picks is quick and easy and can be done on your desktop or mobile device! You can use the **Team**, **Matchup**, and **Stat** filters to help narrow down available picks or tap on a player's headshot to open their player card and view their stat history and latest news.

1. Navigate to Pick6.

2. Select your sport.

3. Select your pick group.

4. Build your pick set by choosing players and selecting whether you believe they will gain **More** or **Less** than their stat projection.

A visual representation of this process can be found below:

JUMP TO SECTION

Getting Started

Game Mechanics

How to Play - Pick6

Prizing and Payouts

How it Works - Contest and Entries

Rules and Scoring

Promotions and Rewards

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Exhibit 42

FANTASY   SPORTSBOOK   CASINO   PICK6   REIGNMAKERS   DK HORSE   English (US) ⌄   Sign in

DraftKings Help Center (US) > Pick6 > How it Works - Contest and Entries

←

How it Works - Contest Distribution and Prizing (US)

What is Pick6?

Pick6 is a peer-to-peer Fantasy Sports (DFS) contest format offered by DraftKings. Participants compete against each other by building lineups of athletes in a single sport and selecting whether or not their chosen athletes will outperform a statistical projection during real-world sporting events. The goal for participants is to make more correct picks than the other participants in each contest. Winning entries receive a share of the available prizes.

In Pick6, participants can build lineups of between 2 or more players **(3 or more if you are physically located in Colorado)** and compete against participants with the same lineup size. Learn more about where DraftKings Pick6 is available.

How Do Pick6 Entries Work?

After building your Pick Set, you will be asked to enter your **Entry Fees**.

Pick6 contests are $1 entry contests. Each $1 of your **Entry Fees** represents a single entry into a contest and each entry is competing for a share of the contest's total prizes. For example, $10 in **Entry Fees** is equal to 10 entries for the selected Pick Set.

Unlike other DraftKings DFS contests, participants do not need to enter individual contests through the contest lobby. Instead, your **Entry Fees** will be divided into $1 entries, which are then distributed across eligible contests, subject to your confirmation.

Why Are My Pick6 Entries Distributed?

Unlike other DFS contests offered by DraftKings–which can vary by style, entry fee, rules, scoring and other attributes–Pick6 contests are structured so that participants do not need to select individual contests from a lobby. Instead, participants can focus solely on building their Pick Sets. To ensure a consistent entry experience, all participants' entries are distributed in the same manner across eligible contests.

If you prefer to select a specific DFS contest, visit the DraftKings DFS Lobby.

How Are My Pick6 Entries Distributed?

Your entries will be distributed across eligible contests in the following order:

1. Contests where you have no entries; then

2. Contests where you have no entries of the current lineup being entered, but have entries of other Pick Set(s); then

3. Contests where you already have entries of the current Pick Set being entered.

If the number of contests in (1), (2) or (3) above are equal, your entries will be placed in the contests in which you have the fewest number of total entries, irrespective of Pick Set, followed by the contests with the lowest percentage of seats filled at the time of entry submission.

Example 1: Distribution Upon First Time Entering
If you are entering Pick6 contests for the first time with Entry Fees of $20 (20 entries) and there are 15 eligible contests available, your entry distribution will occur as follows:

- 1 entry into each of the 15 contests (15 entries); then

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Example 1: Distribution Upon First Time Entering

If you are entering Pick6 contests for the first time with Entry Fees of $20 (20 entries) and there are 15 eligible contests available, your entry distribution will occur as follows:

- 1 entry into each of the 15 contests (15 entries); then
- 1 entry into each of the 5 contests with the lowest percentage of seats filled (5 entries).

In this example, the final distribution of the 20 entries in 15 eligible contests is: 1 entry in 10 contests and 2 entries in the remaining 5 contests.

Example 2: Distribution When Entering a Second Pick Set

If there are 15 eligible contests available and you enter Pick Set A with Entry Fees of $10 (10 entries), then enter Pick Set B with Entry Fees of $25 (25 entries), your entry distribution will occur as follows:

- 1 entry of Pick Set A in each of the 10 contests with the lowest percentage of seats filled (10 entries of Pick Set A); then
- 1 entry of Pick Set B in each of the 5 contests without an entry of Pick Set A (5 entries of Pick Set B); then
- 1 entry of Pick Set B in each of the 15 contests (15 entries of Pick Set B); then
- 1 entry of Pick Set B in each of the 5 contests that have the lowest percentage of seats filled (5 entries of Pick Set B)

In this example, the final distribution of 10 entries of Pick Set A and 25 entries of Pick Set B in 15 eligible contests is: 3 entries in 5 contests and 2 entries in 10 contests.

Please Note: Pick6 contests contain a Max Entry Limit of 150 entries. Accordingly, the maximum Entry Fees at any time is 150x the total number of eligible contests available at the time of entry. If your Entry Fees exceed the number of eligible contests at time of entry, your Entry Fees will be allocated into as many contests as possible, which may reduce your total Entry Fees.

What Happens if a Contest Fills Before I Submit My Entries?

If a contest from your distribution fills prior to your entries being successfully submitted, your entries will be redistributed using the same methodology. If you want to approve all changes that occur to your original contest distribution, you can enable this setting, which is located in the Gameplay Settings menu within MyAccount.

How are Prizes Determined?

Pick6 contest entries are scored based on the number of correct pick selections made by the participants. A portion of the total prize pool for each contest is pre-assigned to entries with a certain number of correct picks. Winning entries receive a share of prizes as described in each contest's prize table.

For example, a 5-Pick NFL contest with a $10,000 total prize pool may have the following prize structure:

5/5 Correct: Splits $8,0000

4/ 5 Correct: Splits $2,000

In this example, all entries having 5/5 correct, would win a share of the $8,000. The exact share would be calculated based on the amount of Standings Points for each entry. Learn more about how Standings Points are calculated.

Your total prize amount is calculated by adding together the prizes awarded from each contest in which your lineup was entered.

To review the requirements to earn prizes for a contest, go to the "Prize Structure" tab in the contest details.

Where Do I Find More Information About My Pick6 Contests?

Within the Pick6 entry process, the contests that your entries have been distributed into can be viewed by clicking *"View Contest Breakdown."* Important information, such as entrants, prize structure and rules, for each individual contest are available in the contest details, which can be found by tapping on any *ContestID* in the contest breakdown list. Learn more about locating your Contest Details.

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Exhibit 43

Migrate hundreds of microservices to the cloud with zero downtime — Part 1

Valerii Golovko · Follow

Published in DraftKings Engineering · 6 min read · Oct 2, 2024

🖐 13   🔖 ▶ ⬆

Introduction

Imagine the situation when a mature high-load distributed system, already serving millions of customers, needs to be changed so that a significant part of it can be moved from an On-Premise solution to the Cloud with Zero Downtime. DraftKings faced that challenge as a business in a highly competitive market looking for ways to improve efficiency and scalability.

This article aims to provide an overview of such migration and brings valuable insights if you're also considering a transition:

This article aims to provide an overview of such migration and brings valuable insights if you're also considering a transition:

- From/to an On-Prem solution

- Move from one Data Center provider with IT support and certain control on your side to another Cloud/Data Center

- Switch from one Cloud provider to another

- Try to achieve certain Multi-Cloud or Hybrid-Cloud strategies

- Modernize legacy systems for performance improvements and cost optimization

- Plan disaster recovery and failover scenarios for business continuity during such migration

The decision to move to the cloud or build an On-Prem solution varies depending on a business's strategies and available resources. There is no silver bullet solution for what to choose a Cloud or On-Prem environment. At DraftKings, the decision to modify the topology, where some parts of the system reside On-Prem and others in the Cloud, was a strategic choice aimed at leveraging the best of both environments while also considering factors such as regulatory requirements.

This is not an exhaustive list of possible reasons why you would need to do a topology modification of your system:

Scalability strategy — in a sports-related business, where load varies much throughout the year, even just one single game could result in X-times more load in comparison to the regular level.

With On-premise approach, there is full control in requesting required resources, limited only by company demand. However, it's pointless and not-efficient to request resources for a peak load and keep it running or leave it idle. Cloud is able to provide better flexibility in requested compute, where scale could be adjusted on demand and mostly in automated way. However, it is worth pointing out that it's applicable for certain parts of the system with such variable load and not applicable for the whole system.

Operational strategy — in case of On-Premise environment, there is a high level of control and flexibility over the hardware that is in use. At the same time, it's fully up to the company to manage this hardware and keep such expertise in-house or out-source such activities like:

- DevOps support and management of requested hardware.

level of control and flexibility over the hardware that is in use. At the same time, it's fully up to the company to manage this hardware and keep such expertise in-house or out-source such activities like:

- DevOps support and management of requested hardware.

- Integrating new hardware when needed, both for increasing business demand and maintenance reasons.

Resiliency strategy — defining disaster recovery strategies requires proper analysis and planning and should take into consideration many aspects of the system, like geo-location presence, system scale, persistence recovery and replication, services automatic recovery, etc. There is no silver bullet, so choosing a suitable approach based on an On-Premise or Cloud solution requires taking into consideration all these aspects and nuances of the system.

Background

The part of the system that required a topology modification was hosted by a reputable Data Center provider, offering sufficient resources and an acceptable level of control.

The system is built on the principles of Microservice Architecture and consists of various service types and communication channels between them. Here is a brief overview:

Service Types

- **Pipeline Services:** These are ETL-like services that take in data, process it, and produce outputs that flow downstream until they reach the end user, typically through a browser or mobile app.

- **API Services:** These are HTTP services that provide certain APIs for serving data or execute commands.

- **Processor Services:** These are job-like services that perform certain repetitive workloads and produce an output that is used by other types of services.

- **Hybrid Services:** Some services combine the features of the above types to meet specific needs.

Internal Communication

Services communicate through various channels including but not limited to:

- **Kafka:** This is one of the main communication channels between services.

- **HTTP:** Various flows involve request/response communication to execute a certain CRUD operation, trigger a business flow, run a job, etc.

- **Kafka**: This is one of the main communication channels between services.

- **HTTP**: Various flows involve request/response communication to execute a certain CRUD operation, trigger a business flow, run a job, etc.

- Others — out of the scope of the article.

Persistence storages

For persistence, there are in use variety of technologies including classic SQL as well as NoSQL databases and storages for Business Intelligence like:

- MSSQL server

- PostgreSQL

- MongoDB

- Aerospike

- Snowflake

Migration Strategies

Given the complexity and size of the system, the fastest strategy is to stop it On-Prem and start it in the Cloud. However, this approach is unacceptable from the business perspective and causes confusion for the customers due to the downtime. Additionally, it creates incredibly high risk in case some services won't be able to operate in the new setup on the first try.

Therefore, a better approach would be to gradually roll out different pieces of the system to the Cloud with minimal downtime.

However, during the transition phase when the system is not fully migrated, it's important to minimize two things:

- **Inter-service communication latencies**: During the migration, it's inevitable that some parts of the system will be in the new Cloud environment and some in the old On-Prem solution. This setup results in additional inter-service communication latencies. So, to define the move of a certain piece of the system, it's important to minimize the amount of additional latencies.

- **Backward Data flow**: Once a service is moved to the Cloud, it's inevitable that it will need to consume outputs or call services in the old On-Prem (Forward Data Flow). However, it's better to plan the migration in a way that minimizes the opposite — Backward Data Flow. In other words better to avoid a setup when a service located in On-Prem needs to consume output or call an API of a service located in the Cloud. For example, if there are circular dependencies between services, it's better to move that circle of services in one batch to the Cloud to avoid double latencies

(Forward Data Flow). However, it's better to plan the migration in a way that minimizes the opposite Backward Data Flow. In other words, to avoid a setup when a service located in On-Prem needs to consume output or call an API of a service located in the Cloud. For example, if there are circular dependencies between services, it's better to move that circle of services in one batch to the Cloud to avoid double latencies inside the circle.

As a result, the following strategies came up:

From right to left

In the describing system, the majority of services are pipelines. So, it makes sense to start moving services closer to the end-user first, then move upstream services, and so on. However, this approach can be complicated if there are circular dependencies between services. In such case better to migrate the whole circle on one turn when possible.
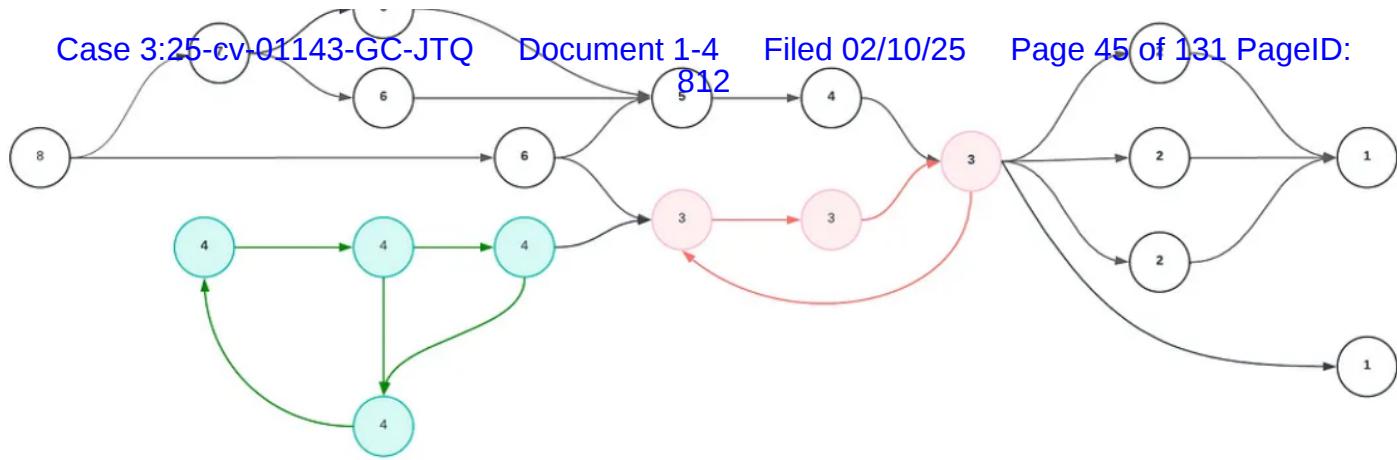
APIs go last

The majority of inter-service communication of the describing system is done via Kafka. However, there are services that provide certain HTTP APIs. Based on the described "avoid **Backward Data flow**" principle, it makes sense to move all API consumers to the Cloud first. Once that's done, move the API services.

Database goes last

Based on the same "avoid **Backward Data flow**" principle better to migrate all the services with database interaction first and their databases last when it's not possible to migrate all consuming services and their databases in one turn.

To highlight those strategies, you could imagine a system as a graph, with nodes representing services and arrows showing the Data Flow between them:

Document title: Migrate hundreds of microservices to the cloud with zero downtime — Part 1 | by Valerii Golovko | DraftKings Engineering | Medium
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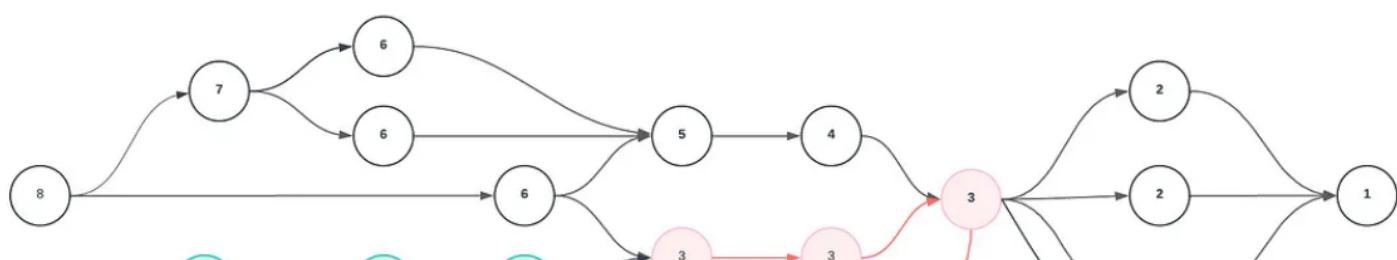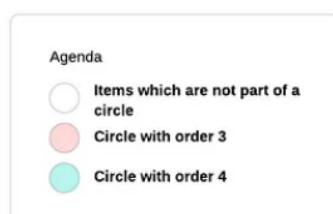
In the diagram above, numbers inside nodes represent the potential order of the service migrating to the Cloud.

- Nodes without color represent services that are not part of any circle from the Data Flow point perspective

- Such nodes which have the same number could be migrated in parallel without waiting for each other

- Nodes with a color represent services that are in a circle from the Data Flow point perspective

- It is better to move such a circle of services altogether if possible to avoid double latencies. It will be discussed below what can be done when that is not an option.

- Number in such cases represents the migration order of a circle as a whole.

. . .

What's next

The second and third part of the article will be focused on how to apply described strategies using Pipeline and HTTP API service types as examples.

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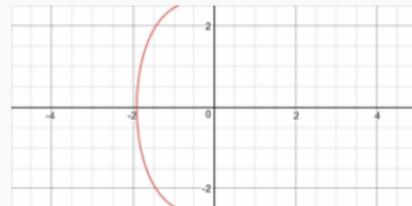
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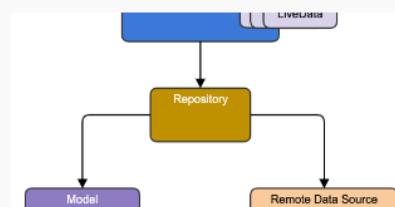Pipeline service migration

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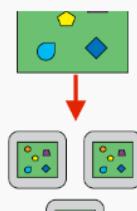
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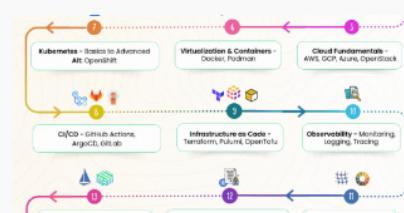20 stories · 3249 saves

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Exhibit 44

Making Strides Toward Serverless

Matt Robinson · Follow
Published in DraftKings Engineering · 8 min read · Mar 30, 2021

If you have explored recent trends in cloud application development, you have probably come across mentions of the "serverless" deployment model. This model of application deployment places heavy emphasis on the business logic itself, moving the onus to the cloud provider to provision, deploy and scale the application code to servers. As our business grows and expands at DraftKings, we've found ourselves spending a considerable amount of development time on managing scalability of processes that are constantly being fed more and more data, leading us to explore serverless as an option.

Cloud providers like Amazon Web Services (AWS), Microsoft Azure, or Google Cloud have developed deep integrations between their function-as-a-service (another term for a cloud provider's serverless offering) platforms and a majority of their other product offerings. These integration points allow for serverless functions to be executed in response to changes that occur in these products. For example, triggers that fire when new data is inserted in a database, or when new events are published to an event bus. DraftKings is an Amazon Web Services customer, and we have benefited greatly from the variety provided within their serverless triggers. At the time of writing, AWS's function-as-a-service product, known as Lambda, has 20+ integration points with other AWS services or third party SaaS providers. These integrations cover most of the core product offerings:

- Messaging services like SQS, SNS, and Amazon MQ

- Streaming data services like Kinesis, DynamoDB Streams, and Apache Kafka

- HTTP proxying services like API Gateway and EC2 Application Load Balancing

- Data storage services like S3 and RDS

Available AWS serverless triggers. Not listed are third party SaaS integrations via the EventBridge product.

Engineering teams at DraftKings have found the serverless deployment model to be beneficial for scalability and speed of iteration. The emphasis on *simple functions* that play one small part in a larger application architecture has allowed us to express larger, more complex chains of code execution that meet the needs of the business, with less operational overhead. The on-demand nature of Lambda also allows us to automatically scale down when resources are not needed, providing a cost savings for the business and helping to make our global infrastructure more environmentally sustainable. For example, we have an event streaming architecture that is comprised of 8 separate lambda functions that manage integration points with third party SaaS providers for analytics, monitoring, and CRM purposes.

Serverless Functions vs Microservices

Using the example above of our event streaming architecture, we can compare two different hypothetical solution architectures. A standard industry recommendation for this problem might be to develop a microservice whose single responsibility is to manage the delivery of this input data to the various integrations. A simple solution to this problem might look like the following:

```
fetch data from source

for each integration:
    transform data to correct format
    send data to integration API
    record success / failure, optionally retry
```

In order to achieve greater scale, it becomes obvious that these tasks may need to be parallelized. Developers tend to reach for queues in order to accomplish this — either in-memory queueing, or an external queueing service like Amazon SQS. This allows for separate code flows for each integration.

```
fetch data from source

for each integration:
    add data to integration queue
```

```
fetch data from source

for each integration:
    add data to integration queue

...

(each integration queue has a listener with the following)

while (data is available on integration queue):
    retrieve data from integration queue
    transform data to correct format
    send data to integration API
    record success / failure, optionally retry
```

Which, in turn, allows each integration queue to be processed in parallel. You would then deploy this microservice application to one or more servers, scaling to more servers as the volume of input data increases.

The Serverless Architecture Approach

The serverless approach to this problem still requires queueing logic in order to achieve parallel work. However, each consuming process does not execute on the same virtual machine as the others. This avoids the "noisy neighbor" problem — where a process or application is constrained due to a separate process using up the available resource. In the microservice architecture, if a bug is shipped that accidentally causes one integration flow to use up 1GB memory, all the other integrations executing on that machine could be affected! In a serverless function architecture, these separate integrations are scaled entirely independently. Each process has its own allocated amount of vCPU and memory, as well as upper and lower bounds on desired concurrency.

It may initially sound daunting to manage 8 separate applications as serverless functions in place of what could be one microservice — suddenly there are 8 different processes to deploy and monitor! We realized that while these tasks all share the similar DNA of transforming data and exporting it to a secondary destination, they did not need to share substantial business logic. Each integration requires its own logic that is specific to the provider. The initial task of creating these functions was really just an exercise in defining boundaries between application logic, and cutting out piece by piece into separate code packages. For the few pieces of logic we have identified that should be shared, we have pulled common code into shared packages. Ongoing maintenance has been less risky with these simpler functions, as there are less moving parts within one process to consider.

An example of how DraftKings monitors serverless functions.

Over the long run, it has proven to be very beneficial to have these separate integrations maintain isolated resource pools, especially when dealing with a single unhealthy dependency or SaaS provider. Having the ability to decouple the resource utilization of producers and consumers of data allows for finer grained performance tuning of each DraftKings process. Since Lambda provides ample monitoring out of the box, it has become much simpler to identify the resource allocation needs of each process and identify code changes with hidden performance impacts when the scope is isolated to a single function execution. Resource-demanding jobs that can be parallelized are great candidates to evaluate if a serverless solution fits the problem, as Lambda (and other function-as-a-service products) generally do not require any intervention to increase the concurrency of the functions — these products intelligently detect when functions should be scaled up or down based on the volume of data coming through the configured function trigger.

Patterns for Hybrid Serverless Adoption

Many sources around the web preach about the benefits of a fully serverless software solution. But in some instances, moving an application to a serverless deployment model is not feasible, or would provide little value to the business. DraftKings has opted for a hybrid server/serverless approach to develop cloud native services with clean integrations between our cloud provider's serverless triggers. This has allowed us to approach adoption in smaller steps, without requiring major changes to existing architecture. With a bit of research into the available integration points, we found that cloud products we were already using (or planning on using) have a rich set of serverless function triggers to kick off business logic in response to changes within that product. These function triggers have opened doors to leverage serverless functions as **application glue** — a simple way to connect separate

a bit of research into the available integration points, we found that cloud products we were already using (or planning on using) have a rich set of serverless function triggers to kick off business logic in response to changes within that product. These function triggers have opened doors to leverage serverless functions as **application glue** — a simple way to connect separate processes (whether it be another serverless function, or to an existing server-deployed application) without writing a ton of code to link these two together. I will provide two common scenarios where serverless functions have been a great piece of foundational technology to connect data producers and consumers within the DraftKings architecture.

Streaming Data
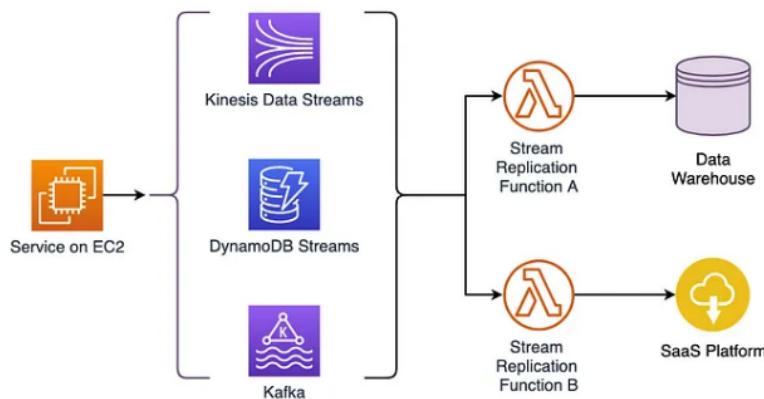
A typical architecture for consuming various stream providers from multiple serverless functions.

One of the more popular opportunities that we've found for a hybrid server/serverless software solution are stream data scenarios. For example, DynamoDB has a feature called DynamoDB Streams that emits a log of database change data. AWS Lambda has an integration that allows a function to be executed in response to new data in this stream, enabling continuous replication of changes to secondary locations such as data warehouses, search indexes or third party APIs. By keeping the replication isolated into its own function, our DK engineering teams are able to ensure that the primary writes performed by a server-deployed application do not compete with these secondary replication tasks for compute resources, and we have flexibility to tune knobs that affect the cadence (batch size and batch window) and resource allocation (memory and CPU) of the replication tasks.
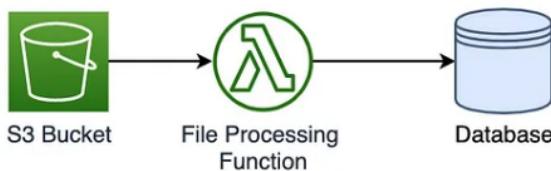
File Storage Processing

Another great way we found to take advantage of a cloud providers function triggers is in static file storage. Some applications are required to ingest file uploads for further processing or transformation. We traditionally leverage Amazon S3 for storage of static contents, and the S3 Lambda integration provides a great way to execute processing logic when new files are uploaded to a bucket. There are two patterns you can follow to leverage the

uploads for further processing or transformation. We traditionally leverage Amazon S3 for storage of static contents, and the S3 Lambda integration provides a great way to execute processing logic when new files are uploaded to a bucket. There are two patterns you can follow to leverage the S3 Lambda integrations:

- Invoke the transformation and ingestion of new data into a database directly from a serverless function

- Kick off long-running processing jobs that are better suited to execute on a server by issuing a REST call to notify the application that a file is available

Two patterns for using serverless triggers to process file uploads.

Deciding which of the two file processing approaches is best for your application really comes down to whether or not you expect your processing jobs to be able to execute within the constraints of your function-as-a-service product. At DraftKings, we leverage both approaches within our applications. Some processes expect files that can be processed in a few seconds or minutes, well within the Lambda resource limitations. However, other file processing flows may take a number of hours to complete, which might require handing off the processing to an application running on a powerful server.

Next Steps

With the recent news of AWS Lambda increasing the maximum CPU and memory allocation to 10GB / 6vCPUs, it will become easier to reach for serverless functions to solve new challenges! As DraftKings iterates on our back-end technology, we continue to evaluate if new development could benefit from the serverless deployment model. We are also refining our

With the recent news of AWS Lambda increasing the maximum CPU and memory allocation to 10GB / 6vCPUs, it will become easier to reach for serverless functions to solve new challenges! As DraftKings iterates on our back-end technology, we continue to evaluate if new development could benefit from the serverless deployment model. We are also refining our shared infrastructure code to enable migration of existing microservices to serverless functions. To learn more about that, check out Dave Musicant's article about how we migrated our microservices to .NET Core!

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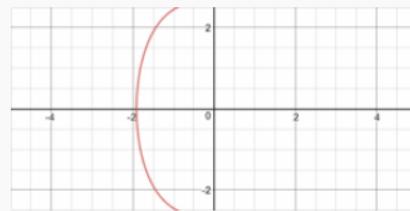Kevin J. Farrell   ···
Apr 20, 2023

Hi Matt, great post. I was curious if you had looked at or tested Oracle Functions and it's integrations w/ other OCI services? I know there are some differences in the supported languages but other than that, curious to hear your insight.

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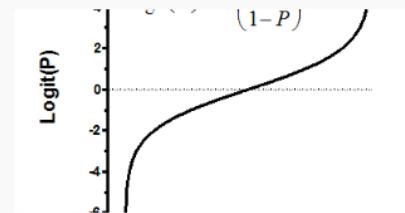Nov 2, 2020   21

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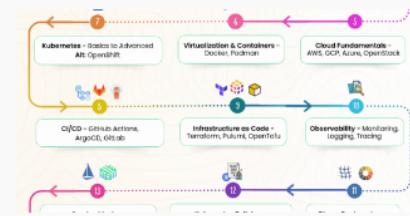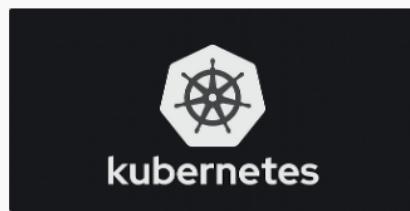### You are an absolute moron for believing in the hype of "AI…

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‹

Welcome

▶ S3 API Reference

▶ Developing with Amazon S3

▶ Code examples

▶ Authenticating Requests (AWS Signature Version 4)

▶ Browser-Based Uploads Using POST

Common Request Headers

Common Response Headers

▶ Error responses

AWS Glossary

Resources

Document History

▶ Appendix

Common Response Headers

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The following table describes response headers that are common to most Amazon S3 responses.

Name	Description
`Access-Control-Allow-Credentials`	A Boolean that determines if the server allows CORS requests to contain credentials. If the `Access-Control-Allow-Origin` request header is set to `'*'` then the `Access-Control-Allow-Credentials` response header will be omitted, else it is set to `true` when CORS evaluation is successful. Type: Boolean Default: None
`Access-Control-Allow-Headers`	A list of HTTP headers allowed for your CORS requests. The `Access-Control-Allow-Headers` response header is returned for successful CORS evaluations and explicitly specifies all allowed `Access-Control-Request-Headers`. Type: String Default: None
`Access-Control-Allow-Methods`	A list that specifies which HTTP methods are allowed. Amazon S3 will only allow CORS requests from allowed CORS methods when the CORS evaluation is successful.

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Amazon Simple Storage Service
API Reference

Welcome

▶ S3 API Reference

▶ Developing with Amazon S3

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▶ Browser-Based Uploads Using POST

Common Request Headers

Common Response Headers

▶ Error responses

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Resources

Document History

▶ Appendix

Common Response Headers

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Name	Description
Expose-Headers	exposes access for applications when the CORS evaluation is successful. Type: String Default: None
Access-Control-Max-Age	The time in seconds that your browser can cache the response for a CORS pre-flight request as identified by the resource, the HTTP method, and the origin. The `Access-Control-Max-Age` response header is only returned when the CORS evaluation is successful. Type: Integer Default: None
Vary	A list that indicates which request headers the CORS evaluation result varies on. The `Vary` response header is only returned when the CORS evaluation is successful. Type: String Default: None
Content-Length	The length in bytes of the body in the response. Type: String

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- Welcome
- ▶ S3 API Reference
- ▶ Developing with Amazon S3
- ▶ Code examples
- ▶ Authenticating Requests (AWS Signature Version 4)
- ▶ Browser-Based Uploads Using POST
- Common Request Headers
- **Common Response Headers**
- ▶ Error responses
- AWS Glossary
- Resources
- Document History
- ▶ Appendix

Common Response Headers

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The following table describes response headers that are common to most Amazon S3 responses.

Name	Description
	01 Mar 2006 12:00:00 GMT. Type: String Default: None
ETag	The entity tag (ETag) represents a specific version of the object. The ETag reflects changes only to the contents of an object, not its metadata. The ETag might or might not be an MD5 digest of the object data. Whether or not it is depends on how the object was created and how it is encrypted, as follows: • Objects created through the AWS Management Console or by the `PUT Object`, `POST Object`, or `Copy` operation: ○ Objects that are plaintext or encrypted by server-side encryption with Amazon S3 managed keys (SSE-S3) have ETags that are an MD5 digest of their data. ○ Objects encrypted by server-side encryption with customer-provided keys (SSE-C) or AWS Key Management Service (AWS KMS) keys (SSE-KMS) have ETags that

On this page   ⟩

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Welcome

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▸ Developing with Amazon S3

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Common Request Headers

Common Response Headers

▸ Error responses

AWS Glossary

Resources

Document History

▸ Appendix

Common Response Headers

PDF

The following table describes response headers that are common to most Amazon S3 responses.

Name	Description
`marker`	was not (`false`) a delete marker. Type: Boolean Valid Values: `true` | `false` Default: false
`x-amz-id-2`	A special token that is used together with the `x-amz-request-id` header to help AWS troubleshoot problems. For information about Support using these request IDs, see Troubleshooting Amazon S3. Type: String Default: None
`x-amz-request-id`	A value created by Amazon S3 that uniquely identifies the request. This value is used together with the `x-amz-id-2` header to help AWS troubleshoot problems. For information about Support using these request IDs, see Troubleshooting Amazon S3. Type: String Default: None
`x-amz-server-side-encryption`	The server-side encryption algorithm used when storing this object in Amazon S3 (for example, `AES256`, `aws:kms`).

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API Reference

‹

- Welcome
- ▸ S3 API Reference
- ▸ Developing with Amazon S3
- ▸ Code examples
- ▸ Authenticating Requests (AWS Signature Version 4)
- ▸ Browser-Based Uploads Using POST
- Common Request Headers
- **Common Response Headers**
- ▸ Error responses
- AWS Glossary
- Resources
- Document History
- ▸ Appendix

Common Response Headers

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The following table describes response headers that are common to most Amazon S3 responses.

Name	Description
	Default: None
`x-amz-request-id`	A value created by Amazon S3 that uniquely identifies the request. This value is used together with the `x-amz-id-2` header to help AWS troubleshoot problems. For information about Support using these request IDs, see Troubleshooting Amazon S3. Type: String Default: None
`x-amz-server-side-encryption`	The server-side encryption algorithm used when storing this object in Amazon S3 (for example, `AES256`, `aws:kms`). Valid Values: `AES256` | `aws:kms`
`x-amz-version-id`	The version of the object. When you enable versioning, Amazon S3 generates a random number for objects added to a bucket. The value is UTF-8 encoded and URL ready. When you `PUT` an object in a bucket where versioning has been suspended, the version ID is always `null`. Type: String Valid Values: `null` | any URL-ready, UTF-8 encoded string

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Documentation > Amazon CloudFront > Developer Guide

Request and response behavior for custom origins

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To understand how CloudFront processes requests and responses when you're using custom origins, see the following sections:

Topics

- How CloudFront processes and forwards requests to your custom origin
- How CloudFront processes responses from your custom origin

How CloudFront processes and forwards requests to your custom origin

Learn about how CloudFront processes viewer requests and forwards the requests to your custom origin.

Contents

- Authentication
- Caching duration and minimum TTL
- Client IP addresses
- Client-side SSL authentication
- Compression
- Conditional requests
- Cookies
- Cross-origin resource sharing (CORS)
- Encryption
- GET requests that include a body
- HTTP methods
- HTTP request headers and CloudFront behavior (custom and Amazon S3 origins)
- HTTP version
- Maximum length of a request and maximum length of a URL
- OCSP stapling
- Persistent connections
- Protocols
- Query strings
- Origin connection timeout and attempts
- Origin response timeout
- Simultaneous requests for the same object (request collapsing)
- User-Agent header

Authentication

If you forward the `Authorization` header to your origin, you can then configure your origin

On this page

How CloudFront processes and forwards requests to your custom origin
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Authentication

If you forward the `Authorization` header to your origin, you can then configure your origin server to request client authentication for the following types of requests:

- `DELETE`
- `GET`
- `HEAD`
- `PATCH`
- `PUT`
- `POST`

For `OPTIONS` requests, client authentication can *only* be configured if you use the following CloudFront settings:

- CloudFront is configured to forward the `Authorization` header to your origin
- CloudFront is configured to *not* cache the response to `OPTIONS` requests

For more information, see Configure CloudFront to forward the Authorization header.

You can use HTTP or HTTPS to forward requests to your origin server. For more information, see Use HTTPS with CloudFront.

Caching duration and minimum TTL

To control how long your objects stay in a CloudFront cache before CloudFront forwards another request to your origin, you can:

- Configure your origin to add a `Cache-Control` or an `Expires` header field to each object.
- Specify a value for Minimum TTL in CloudFront cache behaviors.
- Use the default value of 24 hours.

For more information, see Manage how long content stays in the cache (expiration).

Client IP addresses

If a viewer sends a request to CloudFront and does not include an `X-Forwarded-For` request header, CloudFront gets the IP address of the viewer from the TCP connection, adds an `X-Forwarded-For` header that includes the IP address, and forwards the request to the origin. For example, if CloudFront gets the IP address `192.0.2.2` from the TCP connection, it forwards the following header to the origin:

`X-Forwarded-For: 192.0.2.2`

If a viewer sends a request to CloudFront and includes an `X-Forwarded-For` request header, CloudFront gets the IP address of the viewer from the TCP connection, appends it to the end of the `X-Forwarded-For` header, and forwards the request to the origin. For example, if the viewer request includes `X-Forwarded-For: 192.0.2.4,192.0.2.3` and CloudFront gets the IP address `192.0.2.2` from the TCP connection, it forwards the following header to the origin:

`X-Forwarded-For: 192.0.2.4,192.0.2.3,192.0.2.2`

Some applications, such as load balancers (including Elastic Load Balancing), web application firewalls, reverse proxies, intrusion prevention systems, and API Gateway, append the IP address of the CloudFront edge server that forwarded the request onto the end of the `X-Forwarded-For` header. For example, if CloudFront includes `X-Forwarded-For: 192.0.2.2` in a request that it

On this page

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Some applications, such as load balancers (including Elastic Load Balancing), web application firewalls, reverse proxies, intrusion prevention systems, and API Gateway, append the IP address of the CloudFront edge server that forwarded the request onto the end of the `X-Forwarded-For` header. For example, if CloudFront includes `X-Forwarded-For: 192.0.2.2` in a request that it forwards to ELB and if the IP address of the CloudFront edge server is 192.0.2.199, the request that your EC2 instance receives contains the following header:

`X-Forwarded-For: 192.0.2.2,192.0.2.199`

> ⓘ **Note**
>
> The `X-Forwarded-For` header contains IPv4 addresses (such as 192.0.2.44) and IPv6 addresses (such as 2001:0db8:85a3::8a2e:0370:7334).
>
> Also note that the `X-Forwarded-For` header may be modified by every node on the path to the current server (CloudFront). For more information, see section 8.1 in RFC 7239 ↗. You can also modify the header using CloudFront edge compute functions.

Client-side SSL authentication

CloudFront does not support client authentication with client-side SSL certificates. If an origin requests a client-side certificate, CloudFront drops the request.

Compression

For more information, see Serve compressed files.

Conditional requests

When CloudFront receives a request for an object that has expired from an edge cache, it forwards the request to the origin either to get the latest version of the object or to get confirmation from the origin that the CloudFront edge cache already has the latest version. Typically, when the origin last sent the object to CloudFront, it included an `ETag` value, a `LastModified` value, or both values in the response. In the new request that CloudFront forwards to the origin, CloudFront adds one or both of the following:

- An `If-Match` or `If-None-Match` header that contains the `ETag` value for the expired version of the object.
- An `If-Modified-Since` header that contains the `LastModified` value for the expired version of the object.

The origin uses this information to determine whether the object has been updated and, therefore, whether to return the entire object to CloudFront or to return only an HTTP 304 status code (not modified).

> ⓘ **Note**
>
> `If-Modified-Since` and `If-None-Match` conditional requests are not supported when CloudFront is configured to forward cookies (all or a subset).
>
> For more information, see Cache content based on cookies.

Cookies

You can configure CloudFront to forward cookies to your origin. For more information, see Cache content based on cookies.

On this page

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You can configure CloudFront to forward cookies to your origin. For more information, see **Cache content based on cookies**.

Cross-origin resource sharing (CORS)

If you want CloudFront to respect cross-origin resource sharing settings, configure CloudFront to forward the `Origin` header to your origin. For more information, see **Cache content based on request headers**.

Encryption

You can require viewers to use HTTPS to send requests to CloudFront and require CloudFront to forward requests to your custom origin by using the protocol that is used by the viewer. For more information, see the following distribution settings:

- **Viewer protocol policy**
- **Protocol (custom origins only)**

CloudFront forwards HTTPS requests to the origin server using the SSLv3, TLSv1.0, TLSv1.1, and TLSv1.2 protocols. For custom origins, you can choose the SSL protocols that you want CloudFront to use when communicating with your origin:

- If you're using the CloudFront console, choose protocols by using the **Origin SSL Protocols** check boxes. For more information, see **Create a distribution**.
- If you're using the CloudFront API, specify protocols by using the `OriginSslProtocols` element. For more information, see **OriginSslProtocols** and **DistributionConfig** in the *Amazon CloudFront API Reference*.

If the origin is an Amazon S3 bucket, CloudFront always uses TLSv1.2.

> ⚠ **Important**
>
> Other versions of SSL and TLS are not supported.

For more information about using HTTPS with CloudFront, see **Use HTTPS with CloudFront**. For lists of the ciphers that CloudFront supports for HTTPS communication between viewers and CloudFront, and between CloudFront and your origin, see **Supported protocols and ciphers between viewers and CloudFront**.

GET requests that include a body

If a viewer `GET` request includes a body, CloudFront returns an HTTP status code 403 (Forbidden) to the viewer.

HTTP methods

If you configure CloudFront to process all of the HTTP methods that it supports, CloudFront accepts the following requests from viewers and forwards them to your custom origin:

- `DELETE`
- `GET`
- `HEAD`
- `OPTIONS`
- `PATCH`

On this page

How CloudFront processes and forwards requests to your custom origin

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- `OPTIONS`
- `PATCH`
- `POST`
- `PUT`

CloudFront always caches responses to `GET` and `HEAD` requests. You can also configure CloudFront to cache responses to `OPTIONS` requests. CloudFront does not cache responses to requests that use the other methods.

For information about configuring whether your custom origin processes these methods, see the documentation for your origin.

> ⚠️ **Important**
>
> If you configure CloudFront to accept and forward to your origin all of the HTTP methods that CloudFront supports, configure your origin server to handle all methods. For example, if you configure CloudFront to accept and forward these methods because you want to use `POST`, you must configure your origin server to handle `DELETE` requests appropriately so viewers can't delete resources that you don't want them to. For more information, see the documentation for your HTTP server.

HTTP request headers and CloudFront behavior (custom and Amazon S3 origins)

The following table lists HTTP request headers that you can forward to both custom and Amazon S3 origins (with the exceptions that are noted). For each header, the table includes information about the following:

- CloudFront behavior if you don't configure CloudFront to forward the header to your origin, which causes CloudFront to cache your objects based on header values.
- Whether you can configure CloudFront to cache objects based on header values for that header.

  You can configure CloudFront to cache objects based on values in the `Date` and `User-Agent` headers, but we don't recommend it. These headers have many possible values, and caching based on their values would cause CloudFront to forward significantly more requests to your origin.

For more information about caching based on header values, see Cache content based on request headers.

Header	Behavior if you don't configure CloudFront to cache based on header values	Caching based on header values is supported
Other-defined headers	**Legacy cache settings** – CloudFront forwards the headers to your origin.	Yes
`Accept`	CloudFront removes the header.	Yes
`Accept-Charset`	CloudFront removes the header.	Yes
`Accept-Encoding`	If the value contains `gzip` or `br`, CloudFront forwards a normalized `Accept-Encoding` header to your origin. For more information, see Compression support and Serve compressed files.	Yes

On this page

- How CloudFront processes and forwards requests to your custom origin
- How CloudFront processes responses from your custom origin

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How CloudFront processes and forwards requests to your custom origin

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	`Encoding` header to your origin. For more information, see Compression support and Serve compressed files.	
`Accept-Language`	CloudFront removes the header.	Yes
`Authorization`	• `GET` and `HEAD` requests – CloudFront removes the `Authorization` header field before forwarding the request to your origin. • `OPTIONS` requests – CloudFront removes the `Authorization` header field before forwarding the request to your origin if you configure CloudFront to cache responses to `OPTIONS` requests. CloudFront forwards the `Authorization` header field to your origin if you do not configure CloudFront to cache responses to OPTIONS requests. • `DELETE`, `PATCH`, `POST`, and `PUT` requests – CloudFront does not remove the header field before forwarding the request to your origin.	Yes
`Cache-Control`	CloudFront forwards the header to your origin.	No
`CloudFront-Forwarded-Proto`	CloudFront does not add the header before forwarding the request to your origin. For more information, see Configure caching based on the protocol of the request.	Yes
`CloudFront-Is-Desktop-Viewer`	CloudFront does not add the header before forwarding the request to your origin. For more information, see Configure caching based on the device type.	Yes
`CloudFront-Is-Mobile-Viewer`	CloudFront does not add the header before forwarding the request to your origin. For more information, see Configure caching based on the device type.	Yes
`CloudFront-Is-Tablet-Viewer`	CloudFront does not add the header before forwarding the request to your origin. For more information, see Configure caching based on the device type.	Yes
`CloudFront-Viewer-Country`	CloudFront does not add the header before forwarding the request to your origin.	Yes
`Connection`	CloudFront replaces this header with `Connection: Keep-Alive` before forwarding the request to your origin.	No

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Connection	CloudFront replaces this header with `Connection: Keep-Alive` before forwarding the request to your origin.	No
Content-Length	CloudFront forwards the header to your origin.	No
Content-MD5	CloudFront forwards the header to your origin.	Yes
Content-Type	CloudFront forwards the header to your origin.	Yes
Cookie	If you configure CloudFront to forward cookies, it will forward the `Cookie` header field to your origin. If you don't, CloudFront removes the `Cookie` header field. For more information, see Cache content based on cookies.	No
Date	CloudFront forwards the header to your origin.	Yes, but not recommended
Expect	CloudFront removes the header.	Yes
From	CloudFront forwards the header to your origin.	Yes
Host	CloudFront sets the value to the domain name of the origin that is associated with the requested object. You can't cache based on the Host header for Amazon S3 or MediaStore origins.	Yes (custom) No (S3 and MediaStore)
If-Match	CloudFront forwards the header to your origin.	Yes
If-Modified-Since	CloudFront forwards the header to your origin.	Yes
If-None-Match	CloudFront forwards the header to your origin.	Yes
If-Range	CloudFront forwards the header to your origin.	Yes
If-Unmodified-Since	CloudFront forwards the header to your origin.	Yes
Max-Forwards	CloudFront forwards the header to your origin.	No
Origin	CloudFront forwards the header to your origin.	Yes
Pragma	CloudFront forwards the header to your origin.	No
Proxy-Authenticate	CloudFront removes the header.	No
Proxy-Authorization	CloudFront removes the header.	No
Proxy-...	CloudFront removes the header.	No

On this page

How CloudFront processes and forwards requests to your custom origin

How CloudFront processes responses from your custom origin

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Authorization		
`Proxy-Connection`	CloudFront removes the header.	No
`Range`	CloudFront forwards the header to your origin. For more information, see How CloudFront processes partial requests for an object (range GETs).	Yes, by default
`Referer`	CloudFront removes the header.	Yes
`Request-Range`	CloudFront forwards the header to your origin.	No
`TE`	CloudFront removes the header.	No
`Trailer`	CloudFront removes the header.	No
`Transfer-Encoding`	CloudFront forwards the header to your origin.	No
`Upgrade`	CloudFront removes the header, unless you've established a WebSocket connection.	No (except for WebSocket connections)
`User-Agent`	CloudFront replaces the value of this header field with `Amazon CloudFront`. If you want CloudFront to cache your content based on the device the user is using, see Configure caching based on the device type.	Yes, but not recommended
`Via`	CloudFront forwards the header to your origin.	Yes
`Warning`	CloudFront forwards the header to your origin.	Yes
`X-Amz-Cf-Id`	CloudFront adds the header to the viewer request before forwarding the request to your origin. The header value contains an encrypted string that uniquely identifies the request.	No
`X-Edge-*`	CloudFront removes all `X-Edge-*` headers.	No
`X-Forwarded-For`	CloudFront forwards the header to your origin. For more information, see Client IP addresses.	Yes
`X-Forwarded-Proto`	CloudFront removes the header.	No
`X-HTTP-Method-Override`	CloudFront removes the header.	Yes
`X-Real-IP`	CloudFront removes the header.	No

HTTP version

CloudFront forwards requests to your custom origin using HTTP/1.1.

Maximum length of a request and maximum length of a URL

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How CloudFront processes responses from your custom origin

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Maximum length of a request and maximum length of a URL

The maximum length of a request, including the path, the query string (if any), and headers, is 20,480 bytes.

CloudFront constructs a URL from the request. The maximum length of this URL is 8192 bytes.

If a request or a URL exceeds these maximums, CloudFront returns HTTP status code 413, Request Entity Too Large, to the viewer, and then terminates the TCP connection to the viewer.

OCSP stapling

When a viewer submits an HTTPS request for an object, either CloudFront or the viewer must confirm with the certificate authority (CA) that the SSL certificate for the domain has not been revoked. OCSP stapling speeds up certificate validation by allowing CloudFront to validate the certificate and to cache the response from the CA, so the client doesn't need to validate the certificate directly with the CA.

The performance improvement of OCSP stapling is more pronounced when CloudFront receives numerous HTTPS requests for objects in the same domain. Each server in a CloudFront edge location must submit a separate validation request. When CloudFront receives a lot of HTTPS requests for the same domain, every server in the edge location soon has a response from the CA that it can "staple" to a packet in the SSL handshake; when the viewer is satisfied that the certificate is valid, CloudFront can serve the requested object. If your distribution doesn't get much traffic in a CloudFront edge location, new requests are more likely to be directed to a server that hasn't validated the certificate with the CA yet. In that case, the viewer separately performs the validation step and the CloudFront server serves the object. That CloudFront server also submits a validation request to the CA, so the next time it receives a request that includes the same domain name, it has a validation response from the CA.

Persistent connections

When CloudFront gets a response from your origin, it tries to maintain the connection for several seconds in case another request arrives during that period. Maintaining a persistent connection saves the time required to re-establish the TCP connection and perform another TLS handshake for subsequent requests.

For more information, including how to configure the duration of persistent connections, see Keep-alive timeout (custom origins only) in the section Distribution settings reference.

Protocols

CloudFront forwards HTTP or HTTPS requests to the origin server based on the following:

- The protocol of the request that the viewer sends to CloudFront, either HTTP or HTTPS.
- The value of the **Origin Protocol Policy** field in the CloudFront console or, if you're using the CloudFront API, the `OriginProtocolPolicy` element in the `DistributionConfig` complex type. In the CloudFront console, the options are **HTTP Only**, **HTTPS Only**, and **Match Viewer**.

If you specify **HTTP Only** or **HTTPS Only**, CloudFront forwards requests to the origin server using the specified protocol, regardless of the protocol in the viewer request.

If you specify **Match Viewer**, CloudFront forwards requests to the origin server using the protocol in the viewer request. Note that CloudFront caches the object only once even if viewers make requests using both HTTP and HTTPS protocols.

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On this page

How CloudFront processes and forwards requests to your custom origin

How CloudFront processes responses from your custom origin

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If you specify **Match Viewer**, CloudFront forwards requests to the origin server using the protocol in the viewer request. Note that CloudFront caches the object only once even if viewers make requests using both HTTP and HTTPS protocols.

> ⚠ **Important**
>
> If CloudFront forwards a request to the origin using the HTTPS protocol, and if the origin server returns an invalid certificate or a self-signed certificate, CloudFront drops the TCP connection.

For information about how to update a distribution using the CloudFront console, see Update a distribution. For information about how to update a distribution using the CloudFront API, go to UpdateDistribution in the *Amazon CloudFront API Reference*.

Query strings

You can configure whether CloudFront forwards query string parameters to your origin. For more information, see Cache content based on query string parameters.

Origin connection timeout and attempts

Origin connection timeout is the number of seconds that CloudFront waits when trying to establish a connection to the origin.

Origin connection attempts is the number of times that CloudFront attempts to connect to the origin.

Together, these settings determine how long CloudFront tries to connect to the origin before failing over to the secondary origin (in the case of an origin group) or returning an error response to the viewer. By default, CloudFront waits as long as 30 seconds (3 attempts of 10 seconds each) before attempting to connect to the secondary origin or returning an error response. You can reduce this time by specifying a shorter connection timeout, fewer attempts, or both.

For more information, see Control origin timeouts and attempts.

Origin response timeout

The *origin response timeout*, also known as the *origin read timeout* or *origin request timeout*, applies to both of the following:

- The amount of time, in seconds, that CloudFront waits for a response after forwarding a request to the origin.
- The amount of time, in seconds, that CloudFront waits after receiving a packet of a response from the origin and before receiving the next packet.

CloudFront behavior depends on the HTTP method of the viewer request:

- `GET` and `HEAD` requests – If the origin doesn't respond or stops responding within the duration of the response timeout, CloudFront drops the connection. If the specified number of origin connection attempts is more than 1, CloudFront tries again to get a complete response. CloudFront tries up to 3 times, as determined by the value of the *origin connection attempts* setting. If the origin doesn't respond during the final attempt, CloudFront doesn't try again until it receives another request for content on the same origin.
- `DELETE`, `OPTIONS`, `PATCH`, `PUT`, and `POST` requests – If the origin doesn't respond for the duration of the read timeout, CloudFront drops the connection and doesn't try again to contact the origin. The client can resubmit the request if necessary.

For more information, including how to configure the origin response timeout, see Response

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duration of the read timeout, CloudFront drops the connection and doesn't try again to contact the origin. The client can resubmit the request if necessary.

For more information, including how to configure the origin response timeout, see Response timeout (custom origins only).

Simultaneous requests for the same object (request collapsing)

When a CloudFront edge location receives a request for an object and the object isn't in the cache or the cached object is expired, CloudFront immediately sends the request to the origin. However, if there are simultaneous requests for the same object—that is, if additional requests for the same object (with the same cache key) arrive at the edge location before CloudFront receives the response to the first request—CloudFront pauses before forwarding the additional requests to the origin. This brief pause helps to reduce the load on the origin. CloudFront sends the response from the original request to all the requests that it received while it was paused. This is called *request collapsing*. In CloudFront logs, the first request is identified as a `Miss` in the `x-edge-result-type` field, and the collapsed requests are identified as a `Hit`. For more information about CloudFront logs, see CloudFront and edge function logging.

CloudFront only collapses requests that share a cache key. If the additional requests do not share the same cache key because, for example, you configured CloudFront to cache based on request headers or cookies or query strings, CloudFront forwards all the requests with a unique cache key to your origin.

If you want to prevent all request collapsing, you can use the managed cache policy `CachingDisabled`, which also prevents caching. For more information, see Use managed cache policies.

If you want to prevent request collapsing for specific objects, you can set the minimum TTL for the cache behavior to 0 *and* configure the origin to send `Cache-Control: private`, `Cache-Control: no-store`, `Cache-Control: no-cache`, `Cache-Control: max-age=0`, or `Cache-Control: s-maxage=0`. These configurations will increase the load on your origin and introduce additional latency for the simultaneous requests that are paused while CloudFront waits for the response to the first request.

> ⚠ **Important**
>
> Currently, CloudFront doesn't support request collapsing if you enable cookie forwarding in the cache policy, the origin request policy, or the legacy cache settings.

User-Agent header

If you want CloudFront to cache different versions of your objects based on the device that a user is using to view your content, we recommend that you configure CloudFront to forward one or more of the following headers to your custom origin:

- `CloudFront-Is-Desktop-Viewer`
- `CloudFront-Is-Mobile-Viewer`
- `CloudFront-Is-SmartTV-Viewer`
- `CloudFront-Is-Tablet-Viewer`

Based on the value of the `User-Agent` header, CloudFront sets the value of these headers to `true` or `false` before forwarding the request to your origin. If a device falls into more than one category, more than one value might be `true`. For example, for some tablet devices, CloudFront might set both `CloudFront-Is-Mobile-Viewer` and `CloudFront-Is-Tablet-Viewer` to true. For more information about configuring CloudFront to cache based on request headers, see

On this page

How CloudFront processes and forwards requests to your custom origin

How CloudFront processes responses from your custom origin

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true or false before forwarding the request to your origin. If a device falls into more than one category, more than one value might be `true`. For example, for some tablet devices, CloudFront might set both `CloudFront-Is-Mobile-Viewer` and `CloudFront-Is-Tablet-Viewer` to `true`. For more information about configuring CloudFront to cache based on request headers, see [Cache content based on request headers](#).

You can configure CloudFront to cache objects based on values in the `User-Agent` header, but we don't recommend it. The `User-Agent` header has many possible values, and caching based on those values would cause CloudFront to forward significantly more requests to your origin.

If you do not configure CloudFront to cache objects based on values in the `User-Agent` header, CloudFront adds a `User-Agent` header with the following value before it forwards a request to your origin:

```
User-Agent = Amazon CloudFront
```

CloudFront adds this header regardless of whether the request from the viewer includes a `User-Agent` header. If the request from the viewer includes a `User-Agent` header, CloudFront removes it.

How CloudFront processes responses from your custom origin

Learn how CloudFront processes responses from your custom origin.

Contents

- [100 Continue responses](#)
- [Caching](#)
- [Canceled requests](#)
- [Content negotiation](#)
- [Cookies](#)
- [Dropped TCP connections](#)
- [HTTP response headers that CloudFront removes or replaces](#)
- [Maximum cacheable file size](#)
- [Origin unavailable](#)
- [Redirects](#)
- [Transfer-Encoding header](#)

100 Continue responses

Your origin cannot send more than one 100-Continue response to CloudFront. After the first 100-Continue response, CloudFront expects an HTTP 200 OK response. If your origin sends another 100-Continue response after the first one, CloudFront will return an error.

Caching

- Ensure that the origin server sets valid and accurate values for the `Date` and `Last-Modified` header fields.
- CloudFront normally respects a `Cache-Control: no-cache` header in the response from the origin. For an exception, see [Simultaneous requests for the same object (request collapsing)](#).

Canceled requests

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origin. For an exception, see Simultaneous requests for the same object (request collapsing).

Canceled requests

If an object is not in the edge cache, and if a viewer terminates a session (for example, closes a browser) after CloudFront gets the object from your origin but before it can deliver the requested object, CloudFront does not cache the object in the edge location.

Content negotiation

If your origin returns `Vary:*` in the response, and if the value of **Minimum TTL** for the corresponding cache behavior is **0**, CloudFront caches the object but still forwards every subsequent request for the object to the origin to confirm that the cache contains the latest version of the object. CloudFront doesn't include any conditional headers, such as `If-None-Match` or `If-Modified-Since`. As a result, your origin returns the object to CloudFront in response to every request.

If your origin returns `Vary:*` in the response, and if the value of **Minimum TTL** for the corresponding cache behavior is any other value, CloudFront processes the `Vary` header as described in HTTP response headers that CloudFront removes or replaces.

Cookies

If you enable cookies for a cache behavior, and if the origin returns cookies with an object, CloudFront caches both the object and the cookies. Note that this reduces cacheability for an object. For more information, see Cache content based on cookies.

Dropped TCP connections

If the TCP connection between CloudFront and your origin drops while your origin is returning an object to CloudFront, CloudFront behavior depends on whether your origin included a `Content-Length` header in the response:

- **Content-Length header** – CloudFront returns the object to the viewer as it gets the object from your origin. However, if the value of the `Content-Length` header doesn't match the size of the object, CloudFront doesn't cache the object.
- **Transfer-Encoding: Chunked** – CloudFront returns the object to the viewer as it gets the object from your origin. However, if the chunked response is not complete, CloudFront does not cache the object.
- **No Content-Length header** – CloudFront returns the object to the viewer and caches it, but the object may not be complete. Without a `Content-Length` header, CloudFront cannot determine whether the TCP connection was dropped accidentally or on purpose.

We recommend that you configure your HTTP server to add a `Content-Length` header to prevent CloudFront from caching partial objects.

HTTP response headers that CloudFront removes or replaces

CloudFront removes or updates the following header fields before forwarding the response from your origin to the viewer:

- `Set-Cookie` – If you configure CloudFront to forward cookies, it will forward the `Set-Cookie` header field to clients. For more information, see Cache content based on cookies.
- `Trailer`
- `Transfer-Encoding` – If your origin returns this header field, CloudFront sets the value to

On this page

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`Cookie` header field to clients. For more information, see [Cache content based on cookies](#).

- `Trailer`
- `Transfer-Encoding` – If your origin returns this header field, CloudFront sets the value to `chunked` before returning the response to the viewer.
- `Upgrade`
- `Vary` – Note the following:
  - If you configure CloudFront to forward any of the device-specific headers to your origin (`CloudFront-Is-Desktop-Viewer`, `CloudFront-Is-Mobile-Viewer`, `CloudFront-Is-SmartTV-Viewer`, `CloudFront-Is-Tablet-Viewer`) and you configure your origin to return `Vary:User-Agent` to CloudFront, CloudFront returns `Vary:User-Agent` to the viewer. For more information, see [Configure caching based on the device type](#).
  - If you configure your origin to include either `Accept-Encoding` or `Cookie` in the `Vary` header, CloudFront includes the values in the response to the viewer.
  - If you configure CloudFront to forward headers to your origin, and if you configure your origin to return the header names to CloudFront in the `Vary` header (for example, `Vary:Accept-Charset,Accept-Language`), CloudFront returns the `Vary` header with those values to the viewer.
  - For information about how CloudFront processes a value of `*` in the `Vary` header, see [Content negotiation](#).
  - If you configure your origin to include any other values in the `Vary` header, CloudFront removes the values before returning the response to the viewer.
- `Via` – CloudFront sets the value to the following in the response to the viewer:

  `Via: ` *`http-version alphanumeric-string`*` .cloudfront.net (CloudFront)`

  For example, the value is something like the following:

  `Via: 1.1 1026589cc7887e7a0dc7827b4example.cloudfront.net (CloudFront)`

Maximum cacheable file size

The maximum size of a response body that CloudFront saves in its cache is 50 GB. This includes chunked transfer responses that don't specify the `Content-Length` header value.

You can use CloudFront to cache an object that is larger than this size by using range requests to request the objects in parts that are each 50 GB or smaller. CloudFront caches these parts because each of them is 50 GB or smaller. After the viewer retrieves all the parts of the object, it can reconstruct the original, larger object. For more information, see [Use range requests to cache large objects](#).

Origin unavailable

If your origin server is unavailable and CloudFront gets a request for an object that is in the edge cache but that has expired (for example, because the period of time specified in the `Cache-Control max-age` directive has passed), CloudFront either serves the expired version of the object or serves a custom error page. For more information about CloudFront behavior when you've configured custom error pages, see [How CloudFront processes errors when you have configured custom error pages](#).

In some cases, an object that is seldom requested is evicted and is no longer available in the edge cache. CloudFront can't serve an object that has been evicted.

Redirects

On this page

How CloudFront processes and forwards requests to your custom origin

How CloudFront processes responses from your custom origin

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configured custom error pages, see How CloudFront processes errors when you have configured custom error pages.

In some cases, an object that is seldom requested is evicted and is no longer available in the edge cache. CloudFront can't serve an object that has been evicted.

Redirects

If you change the location of an object on the origin server, you can configure your web server to redirect requests to the new location. After you configure the redirect, the first time a viewer submits a request for the object, CloudFront sends the request to the origin, and the origin responds with a redirect (for example, `302 Moved Temporarily`). CloudFront caches the redirect and returns it to the viewer. CloudFront does not follow the redirect.

You can configure your web server to redirect requests to one of the following locations:

- The new URL of the object on the origin server. When the viewer follows the redirect to the new URL, the viewer bypasses CloudFront and goes straight to the origin. As a result, we recommend that you don't redirect requests to the new URL of the object on the origin.
- The new CloudFront URL for the object. When the viewer submits the request that contains the new CloudFront URL, CloudFront gets the object from the new location on your origin, caches it at the edge location, and returns the object to the viewer. Subsequent requests for the object will be served by the edge location. This avoids the latency and load associated with viewers requesting the object from the origin. However, every new request for the object will incur charges for two requests to CloudFront.

Transfer-Encoding header

CloudFront supports only the `chunked` value of the `Transfer-Encoding` header. If your origin returns `Transfer-Encoding: chunked`, CloudFront returns the object to the client as the object is received at the edge location, and caches the object in chunked format for subsequent requests.

If the viewer makes a `Range GET` request and the origin returns `Transfer-Encoding: chunked`, CloudFront returns the entire object to the viewer instead of the requested range.

We recommend that you use chunked encoding if the content length of your response cannot be predetermined. For more information, see Dropped TCP connections.

Next topic: Request and response behavior for origin groups

Previous topic: Request and response behavior for Amazon S3 origins

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Application Performance

Twitter Conversion Tracking

Twitter Conversion Tracking Usage Statistics · Download List of All Websites using Twitter Conversion Tracking
Twitter ads conversion tracking code.
Conversion Optimization · Conversion Tracking

Twitter Website Universal Tag

Twitter Website Universal Tag Usage Statistics · Download List of All Websites using Twitter Website Universal Tag
A tool from Twitter that makes it possible for advertisers to track website conversions and manage tailored audience campaigns.

Facebook Signal

Facebook Signal Usage Statistics · Download List of All Websites using Facebook Signal
Journalists use Signal to surface relevant trends, photos, videos and posts from Facebook and Instagram for use in their storytelling and reporting.

Bing Universal Event Tracking

Bing Universal Event Tracking Usage Statistics · Download List of All Websites using Bing Universal Event Tracking
Universal Event Tracking (UET) is a simple and powerful campaign measurement solution that allows you to track key conversion goals important to your business.
Conversion Optimization · Retargeting / Remarketing

comScore

comScore Usage Statistics · Download List of All Websites using comScore
Market research company that studies internet trends and behavior.
Advertiser Tracking · Audience Measurement · Conversion Optimization · Site Optimization · Visitor Count Tracking

Facebook Pixel

Facebook Pixel Usage Statistics · Download List of All Websites using Facebook Pixel
Facebook Pixel is Facebooks conversion tracking system for ads on Facebook to websites.

Facebook Conversion Tracking

Facebook Conversion Tracking Usage Statistics · Download List of All Websites using Facebook Conversion Tracking

Suggest a Technology

Can't find the technology you are looking for? Send us a suggestion, we will try and add it to our database.

Facebook Pixel

Facebook Pixel is Facebooks conversion tracking system for ads on Facebook to websites.

Facebook Conversion Tracking

Facebook Conversion Tracking Usage Statistics · Download List of All Websites using Facebook Conversion Tracking
Conversion tracking functionality from Facebook, allows a user to track advertisement clicks.
Conversion Tracking · Conversion Optimization

DataXu

DataXu Usage Statistics · Download List of All Websites using DataXu
DataXu's marketing software enables marketers to leverage data and analytics to improve acquisition strategies.

Global Site Tag

Global Site Tag Usage Statistics · Download List of All Websites using Global Site Tag
Google's primary tag for Google Measurement/Conversion Tracking, Adwords and DoubleClick.

Google Conversion Linker

Google Conversion Linker Usage Statistics · Download List of All Websites using Google Conversion Linker
Detects the ad click information in your conversion page URLs and stores this information to associate an ad click with a conversion.

Reddit Conversion Tracking

Reddit Conversion Tracking Usage Statistics · Download List of All Websites using Reddit Conversion Tracking
Conversion tracking system from Reddit.
Conversion Optimization

Claritas

Claritas Usage Statistics · Download List of All Websites using Claritas
Custom audience segments & consumer insights for over 120 million households

TikTok Conversion Tracking Pixel

TikTok Conversion Tracking Pixel Usage Statistics · Download List of All Websites using TikTok Conversion Tracking Pixel
TikTok advertising conversion tracking pixel.
Conversion Optimization · Conversion Tracking

Crimson Hexagon

Crimson Hexagon Usage Statistics · Download List of All Websites using Crimson Hexagon
AI-Powered Consumer Insights tracking platform.
Audience Measurement

Widgets

View Global Trends

Akamai Bot Manager

Akamai Bot Manager Usage Statistics · Download List of All Websites using Akamai Bot Manager
Framework to manage bot traffic based on the needs of your business
Bot Detection

Trustarc Cookie Consent

Trustarc Cookie Consent Usage Statistics · Download List of All Websites using Trustarc Cookie Consent
Cookie consent tool.
Privacy Compliance

Make it Fly

Make it Fly Usage Statistics · Download List of All Websites using Make it Fly
Enhance workforce security with Cisco Duo's Identity Security, MFA, and SSO solutions for robust protection against cyber threats.

OpenAI

Make it Fly Usage Statistics · Download List of All Websites using Make it Fly
Enhance workforce security with Cisco Duo's Identity Security, MFA, and SSO solutions for robust protection against cyber threats.

OpenAI

OpenAI Usage Statistics · Download List of All Websites using OpenAI
Custom GPT and SSO setup with OpenAI.
AI

Dropbox Business

Dropbox Business Usage Statistics · Download List of All Websites using Dropbox Business
Domain verification for Dropbox Business.

Smartsheet

Smartsheet Usage Statistics · Download List of All Websites using Smartsheet
Businesses with collaboration software
Feedback Forms and Surveys

Zoom Video Conferencing

Zoom Video Conferencing Usage Statistics · Download List of All Websites using Zoom Video Conferencing
Zoom Video Communications software.
Live Chat

GeoComply

GeoComply Usage Statistics · Download List of All Websites using GeoComply
Geolocation security system.

Slack

Slack Usage Statistics · Download List of All Websites using Slack
Messaging app for teams that makes working together simple and efficient.

MongoDB

MongoDB Usage Statistics · Download List of All Websites using MongoDB
Key value store application data platform - site verification.

Font Awesome

Font Awesome Usage Statistics · Download List of All Websites using Font Awesome
Iconic font and CSS toolkit.
Fonts

Google Font API

Google Font API Usage Statistics · Download List of All Websites using Google Font API
The Google Font API helps you add web fonts to any web page.
Fonts

Google Tag Manager

Google Tag Manager Usage Statistics · Download List of All Websites using Google Tag Manager
Tag management that lets you add and update website tags without changes to underlying website code.
Tag Management

reCAPTCHA

reCAPTCHA Usage Statistics · Download List of All Websites using reCAPTCHA
Anti-bot CAPTCHA widget from Google.
CAPTCHA

TeamViewer

TeamViewer Usage Statistics · Download List of All Websites using TeamViewer
A link or SSO Verification to Team View software.
Web Badge

Ahrefs Site Verification

Ahrefs Site Verification Usage Statistics · Download List of All Websites using Ahrefs Site Verification
Verifying ownership for a specific domain with an AHREF.

A link or SSO Verification to Team View software.

Ahrefs Site Verification

Ahrefs Site Verification Usage Statistics · Download List of All Websites using Ahrefs Site Verification

Verifying ownership of your project or website on AHREFs.

Global Privacy Control

Global Privacy Control Usage Statistics · Download List of All Websites using Global Privacy Control

This product helps you take control of your privacy by allowing you to globally opt out of data collection and data sharing.
Privacy Compliance

US Privacy User Signal Mechanism

US Privacy User Signal Mechanism Usage Statistics · Download List of All Websites using US Privacy User Signal Mechanism

The US Privacy API (USP API) is a lightweight API used to communicate signals represented in the US Privacy String.
Privacy Compliance

DocuSign

DocuSign Usage Statistics · Download List of All Websites using DocuSign

Document signature system.
Feedback Forms and Surveys

CrUX Dataset

CrUX Dataset Usage Statistics · Download List of All Websites using CrUX Dataset

CrUX is a data collection system that gathers information about how real users interact with websites. This website is included in the user experiences data gathered from Google Chrome and thus considered sufficiently popular on the Internet.

CrUX Top 10k

CrUX Top 10k Usage Statistics · Download List of All Websites using CrUX Top 10k

Relative measure of site popularity within the CrUX dataset, measured by the total number of navigations on the origin. This site is in the top 10k.

CrUX Top 50k

CrUX Top 50k Usage Statistics · Download List of All Websites using CrUX Top 50k

Relative measure of site popularity within the CrUX dataset, measured by the total number of navigations on the origin. This site is in the top 50k.

Cloudflare Radar

Cloudflare Radar Usage Statistics · Download List of All Websites using Cloudflare Radar

The website appears on the Cloudflare Radar Top 1m sites list

Cloudflare Radar Top 50k

Cloudflare Radar Top 50k Usage Statistics · Download List of All Websites using Cloudflare Radar Top 50k

The website appears in the Cloudflare Radar Top 50,000.

Box

Box Usage Statistics · Download List of All Websites using Box

A widget displaying content from document management platform Box.

Language   View Global Trends

English HREF LANG

English HREF LANG Usage Statistics · Download List of All Websites using English HREF LANG

This webpage has alternate versions available in English via the use of the hreflang tag.

English – Inferred

English – Inferred Usage Statistics · Download List of All Websites using English – Inferred

Based on the title and description text the website content is potentially English.

English - Inferred

Based on the title and description text the website content is potentially English.

Frameworks   View Global Trends

Adobe Enterprise Cloud
Adobe Enterprise Cloud Usage Statistics · Download List of All Websites using Adobe Enterprise Cloud
Emails on this domain can create Adobe Enterprise Cloud accounts.

Contentstack
Contentstack Usage Statistics · Download List of All Websites using Contentstack
A headless CMS specifically designed for enterprises and large scale deployments.

ASP.NET
ASP.NET Usage Statistics · Download List of All Websites using ASP.NET
ASP.NET is a web application framework marketed by Microsoft that programmers can use to build dynamic web sites, web applications and XML web services. It is part of Microsoft's .NET platform and is the successor to Microsoft's Active Server Pages (ASP) technology.

Ruby on Rails
Ruby on Rails Usage Statistics · Download List of All Websites using Ruby on Rails
Ruby on Rails is an open-source web framework that is optimized for programmer happiness and sustainable productivity.

Facebook Domain Verification
Facebook Domain Verification Usage Statistics · Download List of All Websites using Facebook Domain Verification
Domain Verification provides a way for you to claim ownership of your domain in Facebook Business Manager.

Java EE
Java EE Usage Statistics · Download List of All Websites using Java EE
Java Platform, Enterprise Edition (Java EE) is the industry standard for developing portable, robust, scalable and secure server-side Java applications.

Remix
Remix Usage Statistics · Download List of All Websites using Remix
Full stack web framework.

Content Delivery Network   View Global Trends

Akamai Global Host
Akamai Global Host Usage Statistics · Download List of All Websites using Akamai Global Host
Akamai Global Host provides a geographically co-located caching server for website content.

CloudFront
CloudFront Usage Statistics · Download List of All Websites using CloudFront
Amazon CloudFront is a web service for content delivery. It integrates with other Amazon Web Services to give developers and businesses an easy way to distribute content to end users with low latency, high data transfer speeds, and no commitments.

AJAX Libraries API
AJAX Libraries API Usage Statistics · Download List of All Websites using AJAX Libraries API
The AJAX Libraries API is a content distribution network and loading architecture for the most popular, open source JavaScript libraries.

Cloudflare
Cloudflare Usage Statistics · Download List of All Websites using Cloudflare
Automatically optimizes the delivery of your web pages so your visitors get the fastest page load times and best performance.

The AJAX Libraries API is a content distribution network and loading architecture for the most popular, open source JavaScript libraries.

☁ Cloudflare

Cloudflare Usage Statistics · Download List of All Websites using Cloudflare

Automatically optimizes the delivery of your web pages so your visitors get the fastest page load times and best performance.

G GStatic Google Static Content

GStatic Google Static Content Usage Statistics · Download List of All Websites using GStatic Google Static Content

Google has off-loaded static content (Javascript/Images/CSS) to a different domain name in an effort to reduce bandwidth usage and increase network performance for the end user.

ⓜ OSS CDN

OSS CDN Usage Statistics · Download List of All Websites using OSS CDN

Open Source Software CDN from MaxCDN.

ⓐ Akamai

Akamai Usage Statistics · Download List of All Websites using Akamai

Akamai provides a distributed computing platform for global Internet content and application delivery.

🎬 Zencoder CDN

Zencoder CDN Usage Statistics · Download List of All Websites using Zencoder CDN

This page has content hosted on the Zencoder CDN, owned by Brightcove.

cdnjs CDN JS

CDN JS Usage Statistics · Download List of All Websites using CDN JS

CloudFlare's CDN with popular javascript frameworks available.

Ⓤ UNPKG

UNPKG Usage Statistics · Download List of All Websites using UNPKG

unpkg is a fast, global content delivery network for everything on npm.

aws Amazon S3

Amazon S3 Usage Statistics · Download List of All Websites using Amazon S3

Amazon Simple Storage provides unlimited storage to developers and online businesses - saving costs and increase storage reliability.

🔴 jsDelivr

jsDelivr Usage Statistics · Download List of All Websites using jsDelivr

A free CDN where Javascript developers can host their files. Encompasses MaxCDN, and BootstrapCDN.

Mobile   View Global Trends

G Viewport Meta

Viewport Meta Usage Statistics · Download List of All Websites using Viewport Meta

This page uses the viewport meta tag which means the content may be optimized for mobile content.

🍎 Apple Mobile Web Clips Icon

Apple Mobile Web Clips Icon Usage Statistics · Download List of All Websites using Apple Mobile Web Clips Icon

This page contains an icon for iPhone, iPad and iTouch devices.

🍎 Mobile Non Scaleable Content

Mobile Non Scaleable Content Usage Statistics · Download List of All Websites using Mobile Non Scaleable Content

This content is formatted for mobile devices, it does not allow the content to be scaled.

🍎 IPhone / Mobile Compatible

IPhone / Mobile Compatible Usage Statistics · Download List of All Websites using IPhone / Mobile Compatible

The website contains code that allows the page to support iPhone / Mobile Content.

IPhone / Mobile Compatible Usage Statistics · Download List of All Websites using IPhone / Mobile Compatible

The website contains code that allows the page to support IPhone / Mobile Content.

Payment
View Global Trends

🔷 Sift
Sift Usage Statistics · Download List of All Websites using Sift
Fraud prevention tools.

💳 American Express
American Express Usage Statistics · Download List of All Websites using American Express
The website accepts payments with American Express.
Payment Acceptance

🔴 MasterCard
MasterCard Usage Statistics · Download List of All Websites using MasterCard
The website accepts payments with MasterCard.
Payment Acceptance

Visa
Visa Usage Statistics · Download List of All Websites using Visa
The website accepts payments with Visa.
Payment Acceptance

ʷ Euro
Euro Usage Statistics · Download List of All Websites using Euro
The website uses the € symbol on its website - meaning it may accept payment in Euros.
Currency

𝐏 PayPal
PayPal Usage Statistics · Download List of All Websites using PayPal
The website accepts payments with PayPal.
Payment Acceptance

Audio / Video Media
View Global Trends

📹 Zoom
Zoom Usage Statistics · Download List of All Websites using Zoom
Enterprise video communications platform.
Live Stream / Webcast

🐾 Brightcove
Brightcove Usage Statistics · Download List of All Websites using Brightcove
Brightcove lets you realize the potential of online video with the most comprehensive Internet TV service available today
Digital Video Ads · Enterprise · Live Stream / Webcast · Online Video Platform · Video Analytics · Video Players

🔵 VideoJS
VideoJS Usage Statistics · Download List of All Websites using VideoJS
VideoJS is an HTML5 Video Player, built with Javascript and CSS, with a fallback to a Flash video player for when the browser doesn't support HTML5 video. Owned by Brightcove.
Video Players

▶️ YouTube
YouTube Usage Statistics · Download List of All Websites using YouTube
Embedded videos from YouTube.
Live Stream / Webcast · Online Video Platform · Social Video Platform

🎵 TikTok Embed
TikTok Embed Usage Statistics · Download List of All Websites using TikTok Embed
Short form video embed.

 TikTok Embed

TikTok Embed Usage Statistics · Download List of All Websites using TikTok Embed

Short form video embed.

Content Management System   View Global Trends

☒ Atlassian Cloud

Atlassian Cloud Usage Statistics · Download List of All Websites using Atlassian Cloud

Products including Jira and Confluence.
Ticketing System

JavaScript Libraries and Functions   View Global Trends

◣ Sentry

Sentry Usage Statistics · Download List of All Websites using Sentry

JavaScript bug tracking software through Sentry's javascript client Raven.

⬚ Uniform

Uniform Usage Statistics · Download List of All Websites using Uniform

Uniform masks your standard form controls with custom themed controls.
jQuery Plugin

🐦 Twitter Platform

Twitter Platform Usage Statistics · Download List of All Websites using Twitter Platform

The page embeds the Twitter platform in one method or another.

🅕 Facebook for Websites

Facebook for Websites Usage Statistics · Download List of All Websites using Facebook for Websites

Allows a user to make a website more sociable and connected with integrations from the hugely popular Facebook website.

🌀 jQuery

jQuery Usage Statistics · Download List of All Websites using jQuery

JQuery is a fast, concise, JavaScript Library that simplifies how you traverse HTML documents, handle events, perform animations, and add Ajax interactions to your web pages. jQuery is designed to change the way that you write JavaScript.
JavaScript Library

· jQuery Marquee

jQuery Marquee Usage Statistics · Download List of All Websites using jQuery Marquee

Adds an annoying Marquee feature to text like it was 1995 again.

· jQuery Unobtrusive Ajax

jQuery Unobtrusive Ajax Usage Statistics · Download List of All Websites using jQuery Unobtrusive Ajax

A package for jQuery Ajax to support the Microsoft ASP.NET MVC framework.

◪ jQuery QTip

jQuery QTip Usage Statistics · Download List of All Websites using jQuery QTip

qTip is an advanced tooltip plugin for the ever popular jQuery JavaScript framework.

◙ jQuery UI

jQuery UI Usage Statistics · Download List of All Websites using jQuery UI

jQuery UI provides abstractions for low-level interaction and animation, advanced effects and high-level, themeable widgets, built on top of the jQuery JavaScript Library, that you can use to build highly interactive web applications.

○ jQuery Cookie

jQuery Cookie Usage Statistics · Download List of All Websites using jQuery Cookie

A simple, lightweight jQuery plugin for reading, writing and deleting cookies.

▦ jQuery Validate

jQuery Validate Usage Statistics · Download List of All Websites using jQuery Validate

JQuery Form Validation Plugin.

▦ Lazy Load for JQuery

Lazy Load for JQuery Usage Statistics · Download List of All Websites using Lazy Load for JQuery

Delays loading of images in long web pages.

▦ jQuery Mousewheel

jQuery Mousewheel Usage Statistics · Download List of All Websites using jQuery Mousewheel

jQuery Validate Usage Statistics · Download List of All Websites using jQuery Validate

jQuery Form Validation Plugin

Lazy Load for JQuery
Lazy Load for JQuery Usage Statistics · Download List of All Websites using Lazy Load for JQuery
Delays loading of images in long web pages.

jQuery Mousewheel
jQuery Mousewheel Usage Statistics · Download List of All Websites using jQuery Mousewheel
Adds mouse wheel support to the web site.

Fancybox
Fancybox Usage Statistics · Download List of All Websites using Fancybox
FancyBox is a tool for displaying images, html content and multi-media in a Mac-style "lightbox" that floats overtop of web page.

Facebook SDK
Facebook SDK Usage Statistics · Download List of All Websites using Facebook SDK
JavaScript SDK enables you to access all of the features of the Graph API via JavaScript, and it provides a rich set of client-side functionality for authentication and sharing. It differs from Facebook Connect.

bxSlider
bxSlider Usage Statistics · Download List of All Websites using bxSlider
Response jQuery Content Slider
jQuery Plugin · Slider · UI

jScrollPane
jScrollPane Usage Statistics · Download List of All Websites using jScrollPane
jScrollPane is a cross-browser jQuery plugin by Kelvin Luck which converts a browser's default scrollbars into an HTML structure which can be easily skinned with CSS.
jQuery Plugin · UI

script.aculo.us
script.aculo.us Usage Statistics · Download List of All Websites using script.aculo.us
script.aculo.us provides you with easy-to-use, cross-browser user interface JavaScript libraries to make your web sites and web applications fly.
JavaScript Library

Tablesorter
Tablesorter Usage Statistics · Download List of All Websites using Tablesorter
Flexible client-side table sorting.
jQuery Plugin

Google Hosted Libraries
Google Hosted Libraries Usage Statistics · Download List of All Websites using Google Hosted Libraries
Google Hosted Libraries is a globally available content distribution network for the most popular, open-source JavaScript libraries.

Google Hosted jQuery UI
Google Hosted jQuery UI Usage Statistics · Download List of All Websites using Google Hosted jQuery UI
jQuery UI hosted at Google.

Google Hosted jQuery
Google Hosted jQuery Usage Statistics · Download List of All Websites using Google Hosted jQuery
jQuery hosted at Google.

SWFObject
SWFObject Usage Statistics · Download List of All Websites using SWFObject
SWFObject is a small Javascript file used for embedding Adobe Flash content. The script can detect the Flash plug-in in all major web browsers (on Mac and PC) and is designed to make embedding Flash movies as easy as possible.

Retina JS
Retina JS Usage Statistics · Download List of All Websites using Retina JS
Retina.js is an open source script that makes it easy to serve high-resolution images to devices with retina displays.

Respond
Respond Usage Statistics · Download List of All Websites using Respond
A fast & lightweight polyfill for min/max-width CSS3 Media Queries (for IE 6-8, and more)
Compatibility

Webpack

Respond Usage Statistics · Download List of All Websites using Respond
A fast & lightweight polyfill for min/max-width CSS3 Media Queries (for IE 6-8, and more)
Compatibility

Webpack

Webpack Usage Statistics · Download List of All Websites using Webpack
webpack takes modules with dependencies and generates static assets representing those modules.

Tooltipster

Tooltipster Usage Statistics · Download List of All Websites using Tooltipster
Tooltipster is a jQuery tooltip plugin.
jQuery Plugin

Moment JS

Moment JS Usage Statistics · Download List of All Websites using Moment JS
moment.js is a date library for parsing, validating, manipulating, and formatting dates.
JavaScript Library

lodash

lodash Usage Statistics · Download List of All Websites using lodash
Lo-dash is an alternative and a drop-in replacement for Underscore.js.
JavaScript Library

Classnames

Classnames Usage Statistics · Download List of All Websites using Classnames
Javascript utility for conditionally joining classNames together.

localForage

localForage Usage Statistics · Download List of All Websites using localForage
Offline storage system.

React

React Usage Statistics · Download List of All Websites using React
A JavaScript library for building user interfaces from Facebook.
JavaScript Library

es6 promise

es6 promise Usage Statistics · Download List of All Websites using es6 promise
A polyfill for ES6-style Promises.

HTML5 History API

HTML5 History API Usage Statistics · Download List of All Websites using HTML5 History API
A standardized way to manipulate the browser history via script.

Babel

Babel Usage Statistics · Download List of All Websites using Babel
Babel is a JavaScript compiler.
Framework

core-js

core-js Usage Statistics · Download List of All Websites using core-js
Modular standard library for JavaScript.
Framework

lazySizes

lazySizes Usage Statistics · Download List of All Websites using lazySizes
Lazy loader for images (responsive and normal), iframes and scripts, that detects any visibility changes triggered through user interaction, CSS or JavaScript without configuration.

Emotion

Emotion Usage Statistics · Download List of All Websites using Emotion
Library designed for writing css styles with JavaScript.

React Redux

React Redux Usage Statistics · Download List of All Websites using React Redux
Official React bindings for Redux

👥 Emotion

Emotion Usage Statistics · Download List of All Websites using Emotion
Library designed for writing css styles with JavaScript.

React Redux

React Redux Usage Statistics · Download List of All Websites using React Redux
Official React bindings for Redux

W3 Intersection Observer

Intersection Observer Usage Statistics · Download List of All Websites using Intersection Observer
API that can be used to understand the visibility and position of DOM elements relative to a containing element or to the top-level viewport.

JavaScript Modules

JavaScript Modules Usage Statistics · Download List of All Websites using JavaScript Modules
Modern browsers now support native module functionality, optimizing loading and efficiency. Import and export statements are key for using native JavaScript modules.

Advertising   View Global Trends

DoubleClick.Net

DoubleClick.Net Usage Statistics · Download List of All Websites using DoubleClick.Net
DoubleClick enables agencies, marketers and publishers to work together successfully and profit from their digital marketing investments. Owned by Google and now referred to as DoubleClick Digital Marketing or Google Enterprise Advertising.

Twitter Ads

Twitter Ads Usage Statistics · Download List of All Websites using Twitter Ads
Twitter advertising includes conversion tracking and re-marketing tools.
Ad Network · Retargeting / Remarketing

The Trade Desk

The Trade Desk Usage Statistics · Download List of All Websites using The Trade Desk
Data-driven marketing suite that offers marketers a single place to buy all forms of online media.
Demand-side Platform

The Trade Desk Universal Pixel

The Trade Desk Universal Pixel Usage Statistics · Download List of All Websites using The Trade Desk Universal Pixel
The Trade Desk Universal Pixel is a tracking tag that allows multiple processes to be managed with one pixel added to an entire website. It is a JavaScript (JS) tag that can be used to create conversion tracking tags either through the platform UI or API.

Facebook Custom Audiences

Facebook Custom Audiences Usage Statistics · Download List of All Websites using Facebook Custom Audiences
Custom Audiences from your website makes it possible to reach people who visit your website and deliver the right message to them on Facebook.
Retargeting / Remarketing

iSpot.tv

iSpot.tv Usage Statistics · Download List of All Websites using iSpot.tv
Real time TV ad analytics.

Google Remarketing

Google Remarketing Usage Statistics · Download List of All Websites using Google Remarketing
Google code specifically for remarketing/retargeting based advertising.
Retargeting / Remarketing

Google Floodlight Counter

Google Floodlight Counter Usage Statistics · Download List of All Websites using Google Floodlight Counter
The Floodlight Counter tag allows you to count the number of times someone visits your site after clicking on an advertisement for it.

Google Floodlight Sales

G Google Floodlight Counter

Google Floodlight Counter Usage Statistics · Download List of All Websites using Google Floodlight Counter

The Floodlight Counter tag allows you to count the number of times someone visits your site after clicking on an advertisement for it.

G Google Floodlight Sales

Google Floodlight Sales Usage Statistics · Download List of All Websites using Google Floodlight Sales

Implementation of the Google Floodlight Sales Google Marketing Platform system.

AppNexus Direct

AppNexus Direct Usage Statistics · Download List of All Websites using AppNexus Direct
Website is a direct publisher for AppNexus ad content.
ads txt

Carambola Direct

Carambola Direct Usage Statistics · Download List of All Websites using Carambola Direct
Website is a direct publisher for Carambola ad content.
ads txt

G Google Direct

Google Direct Usage Statistics · Download List of All Websites using Google Direct
Website is a direct publisher for Google ad content.
ads txt

IndexExchange Direct

IndexExchange Direct Usage Statistics · Download List of All Websites using IndexExchange Direct
Website is a direct publisher for IndexExchange ad content.
ads txt

PubMatic Direct

PubMatic Direct Usage Statistics · Download List of All Websites using PubMatic Direct
Website is a direct publisher for PubMatic ad content.
ads txt

RubiconProject Direct

RubiconProject Direct Usage Statistics · Download List of All Websites using RubiconProject Direct
Website is a direct publisher for RubiconProject ad content.
ads txt

33 Across Reseller

33 Across Reseller Usage Statistics · Download List of All Websites using 33 Across Reseller
The website owner has authorized another entity to control 33 Across ads on this site.
ads txt

AOL Reseller

AOL Reseller Usage Statistics · Download List of All Websites using AOL Reseller
The website owner has authorized another entity to control AOL ads on this site.
ads txt

AppNexus Reseller

AppNexus Reseller Usage Statistics · Download List of All Websites using AppNexus Reseller
The website owner has authorized another entity to control AppNexus ads on this site.
ads txt

ContextWeb Reseller

ContextWeb Reseller Usage Statistics · Download List of All Websites using ContextWeb Reseller
The website owner has authorized another entity to control ContextWeb ads on this site.
ads txt

Converstand Media Reseller

Converstand Media Reseller Usage Statistics · Download List of All Websites using

ContextWeb Reseller Usage Statistics · Download List of All Websites using ContextWeb Reseller
The website owner has authorized another entity to control ContextWeb ads on this site.
ads txt

Converstand Media Reseller

Converstand Media Reseller Usage Statistics · Download List of All Websites using Converstand Media Reseller
The website owner has authorized another entity to control Converstand Media ads on this site.
ads txt

ORC International Reseller

ORC International Reseller Usage Statistics · Download List of All Websites using ORC International Reseller
The website owner has authorized another entity to control ORC International ads on this site.
ads txt

Google Reseller

Google Reseller Usage Statistics · Download List of All Websites using Google Reseller
The website owner has authorized another entity to control Google ads on this site.
ads txt

GumGum Reseller

GumGum Reseller Usage Statistics · Download List of All Websites using GumGum Reseller
The website owner has authorized another entity to control GumGum ads on this site.
ads txt

IndexExchange Reseller

IndexExchange Reseller Usage Statistics · Download List of All Websites using IndexExchange Reseller
The website owner has authorized another entity to control IndexExchange ads on this site.
ads txt

Lijit Reseller

Lijit Reseller Usage Statistics · Download List of All Websites using Lijit Reseller
The website owner has authorized another entity to control Lijit ads on this site.
ads txt

OpenX Reseller

OpenX Reseller Usage Statistics · Download List of All Websites using OpenX Reseller
The website owner has authorized another entity to control OpenX ads on this site.
ads txt

PubMatic Reseller

PubMatic Reseller Usage Statistics · Download List of All Websites using PubMatic Reseller
The website owner has authorized another entity to control PubMatic ads on this site.
ads txt

RhythmOne Reseller

RhythmOne Reseller Usage Statistics · Download List of All Websites using RhythmOne Reseller
The website owner has authorized another entity to control RhythmOne ads on this site.
ads txt

RubiconProject Reseller

RubiconProject Reseller Usage Statistics · Download List of All Websites using RubiconProject Reseller
The website owner has authorized another entity to control RubiconProject ads on this site.
ads txt

SmartAdServer Reseller

SmartAdServer Reseller Usage Statistics · Download List of All Websites using SmartAdServer Reseller
The website owner has authorized another entity to control SmartAdServer ads on this site.
ads txt

Ads txt

SmartAdServer Reseller

SmartAdServer Reseller Usage Statistics · Download List of All Websites using SmartAdServer Reseller

The website owner has authorized another entity to control SmartAdServer ads on this site.

ads txt

Ads.txt

Ads.txt Usage Statistics · Download List of All Websites using Ads.txt

A public record of Authorized Digital Sellers for a website.

ads txt

Roku

Roku Usage Statistics · Download List of All Websites using Roku

Advertising pixel from Roku.

Yahoo Direct

Yahoo Direct Usage Statistics · Download List of All Websites using Yahoo Direct

Website is a direct publisher for Yahoo ad content.

ads txt

Amazon Reseller

Amazon Reseller Usage Statistics · Download List of All Websites using Amazon Reseller

The website owner has authorized another entity to control Amazon ads on this site.

ads txt

DistrictM Reseller

DistrictM Reseller Usage Statistics · Download List of All Websites using DistrictM Reseller

The website owner has authorized another entity to control DistictM ads on this site.

ads txt

Sonobi Reseller

Sonobi Reseller Usage Statistics · Download List of All Websites using Sonobi Reseller

The website owner has authorized another entity to control Sonobi ads on this site.

ads txt

Yahoo Reseller

Yahoo Reseller Usage Statistics · Download List of All Websites using Yahoo Reseller

The website owner has authorized another entity to control Yahoo ads on this site.

ads txt

Snap Pixel

Snap Pixel Usage Statistics · Download List of All Websites using Snap Pixel

With the Snap Pixel, advertisers can track their customers journey. Snapchat Ads.

Reddit Ads

Reddit Ads Usage Statistics · Download List of All Websites using Reddit Ads

Ads from social network Reddit.

Beachfront Direct

Beachfront Direct Usage Statistics · Download List of All Websites using Beachfront Direct

Website is a direct publisher for Beachfront ad content.

ads txt

FreeWheel Direct

FreeWheel Direct Usage Statistics · Download List of All Websites using FreeWheel Direct

Website is a direct publisher for FreeWheel ad content.

ads txt

SpotXChange Direct

SpotXChange Direct Usage Statistics · Download List of All Websites using SpotXChange Direct

Website is a direct publisher for SpotXChange ad content.

ads txt

AdMan Reseller

AdMan Reseller Usage Statistics · Download List of All Websites using AdMan Reseller

SpotXChange Direct Usage Statistics · Download List of All Websites using SpotXChange Direct

Website is a direct publisher for SpotXChange ad content.

ads txt

AD AdMan Reseller

AdMan Reseller Usage Statistics · Download List of All Websites using AdMan Reseller

Website is a reseller publisher for AdMan ad content

ads txt

epl E-Planning Reseller

E-Planning Reseller Usage Statistics · Download List of All Websites using E-Planning Reseller

Website is a reseller publisher for E-Planning ad content

ads txt

FreeWheel Reseller

FreeWheel Reseller Usage Statistics · Download List of All Websites using FreeWheel Reseller

The website owner has authorized another entity to control FreeWheel ads on this site.

ads txt

OneTag Reseller

OneTag Reseller Usage Statistics · Download List of All Websites using OneTag Reseller

Website is a reseller publisher for OneTag ad content

ads txt

ShareThrough Reseller

ShareThrough Reseller Usage Statistics · Download List of All Websites using ShareThrough Reseller

The website owner has authorized another entity to control ShareThrough ads on this site.

ads txt

Telaria Reseller

Telaria Reseller Usage Statistics · Download List of All Websites using Telaria Reseller

Telaria Reseller Ads.

ads txt

Tremor Video Reseller

Tremor Video Reseller Usage Statistics · Download List of All Websites using Tremor Video Reseller

The website owner has authorized another entity to control Tremor Video ads on this site.

ads txt

OpenX Direct

OpenX Direct Usage Statistics · Download List of All Websites using OpenX Direct

Website is a direct publisher for OpenX ad content.

ads txt

SpringServe Direct

SpringServe Direct Usage Statistics · Download List of All Websites using SpringServe Direct

Website is a direct publisher for SpringServe ad content.

ads txt

Beachfront Reseller

Beachfront Reseller Usage Statistics · Download List of All Websites using Beachfront Reseller

The website owner has authorized another entity to control Beachfront ads on this site.

ads txt

LKQD Reseller

LKQD Reseller Usage Statistics · Download List of All Websites using LKQD Reseller

The website owner has authorized another entity to control LKQD ads on this site.

ads txt

X SpotXChange Reseller

SpotXChange Reseller Usage Statistics · Download List of All Websites using SpotXChange Reseller

LKQD Reseller Usage Statistics · Download List of All Websites using LKQD Reseller
The website owner has authorized another entity to control LKQD ads on this site.

SpotXChange Reseller

SpotXChange Reseller Usage Statistics · Download List of All Websites using SpotXChange Reseller
The website owner has authorized another entity to control SpotXChange ads on this site.
ads txt

Triple Lift Reseller

Triple Lift Reseller Usage Statistics · Download List of All Websites using Triple Lift Reseller
The website owner has authorized another entity to control Triple Lift ads on this site.
ads txt

Undertone Reseller

Undertone Reseller Usage Statistics · Download List of All Websites using Undertone Reseller
Website is a reseller publisher for Undertone ad content
ads txt

Amazon Direct

Amazon Direct Usage Statistics · Download List of All Websites using Amazon Direct
Website is a direct publisher for Amazon ad content.
ads txt

Amazon APS Direct

Amazon APS Direct Usage Statistics · Download List of All Websites using Amazon APS Direct
Amazon Publisher Services direct ad.txt content.
ads txt

Lijit Direct

Lijit Direct Usage Statistics · Download List of All Websites using Lijit Direct
Website is a direct publisher for Lijit ad content.
ads txt

Next Millenium Direct

Next Millenium Direct Usage Statistics · Download List of All Websites using Next Millenium Direct
Website is a direct publisher for Next Millenium ad content
ads txt

OneTag Direct

OneTag Direct Usage Statistics · Download List of All Websites using OneTag Direct
Website is a direct publisher for OneTag ad content
ads txt

SmartAdServer Direct

SmartAdServer Direct Usage Statistics · Download List of All Websites using SmartAdServer Direct
Website is a direct publisher for SmartAdServer ad content.
ads txt

Sovrn Direct

Sovrn Direct Usage Statistics · Download List of All Websites using Sovrn Direct
Website is a direct publisher for Sovrn ad content.
ads txt

TargetSpot Direct

TargetSpot Direct Usage Statistics · Download List of All Websites using TargetSpot Direct
Website is a direct publisher for TargetSpot ad content
ads txt

Adform Reseller

Adform Reseller Usage Statistics · Download List of All Websites using Adform Reseller
The website owner has authorized another entity to control Adform ads on this site.

Direct

Website is a direct publisher of Adform ad content

ads txt

Adform Reseller

Adform Reseller Usage Statistics · Download List of All Websites using Adform Reseller

The website owner has authorized another entity to control Adform ads on this site.

ads txt

AdYouLike Reseller

AdYouLike Reseller Usage Statistics · Download List of All Websites using AdYouLike Reseller

The website owner has authorized another entity to control AdYouLike ads on this site.

ads txt

Amazon APS Reseller

Amazon APS Reseller Usage Statistics · Download List of All Websites using Amazon APS Reseller

Amazon Publisher Services reseller ads.txt content.

Improve Digital Reseller

Improve Digital Reseller Usage Statistics · Download List of All Websites using Improve Digital Reseller

The website owner has authorized another entity to control Improve Digital ads on this site.

ads txt

LoopMe Reseller

LoopMe Reseller Usage Statistics · Download List of All Websites using LoopMe Reseller

The website owner has authorized another entity to control LoopMe ads on this site.

ads txt

Media.net Reseller

Media.net Reseller Usage Statistics · Download List of All Websites using Media.net Reseller

Website is a reseller publisher for Media.net ad content

ads txt

Mobfox Reseller

Mobfox Reseller Usage Statistics · Download List of All Websites using Mobfox Reseller

Website is a reseller publisher for Mobfox ad content

ads txt

Smaato Reseller

Smaato Reseller Usage Statistics · Download List of All Websites using Smaato Reseller

The website owner has authorized another entity to control Smaato ads on this site.

ads txt

SmartyAds Reseller

SmartyAds Reseller Usage Statistics · Download List of All Websites using SmartyAds Reseller

Website is a reseller publisher for SmartyAds ad content

ads txt

Brave Reseller

Brave Reseller Usage Statistics · Download List of All Websites using Brave Reseller

Website is a reseller publisher for Brave ad content

ads txt

The MediaGrid Reseller

The MediaGrid Reseller Usage Statistics · Download List of All Websites using The MediaGrid Reseller

Supply curation and management tools for programmatic media buyers and sellers.

ads txt

Triton Digital Reseller

Triton Digital Reseller Usage Statistics · Download List of All Websites using Triton Digital Reseller

Website is a reseller publisher for Triton Digital ad content

ads txt

Triton Digital Reseller

Triton Digital Reseller Usage Statistics · Download List of All Websites using Triton Digital Reseller

Website is a reseller publisher for Triton Digital ad content

ads txt

Yieldmo Reseller

Yieldmo Reseller Usage Statistics · Download List of All Websites using Yieldmo Reseller

The website owner has authorized another entity to control Yieldmo ads on this site.

ads txt

ShareThrough Direct

ShareThrough Direct Usage Statistics · Download List of All Websites using ShareThrough Direct

Website is a direct publisher for ShareThrough ad content.

ads txt

Brave Direct

Brave Direct Usage Statistics · Download List of All Websites using Brave Direct

Website is a direct publisher for Brave ad content

ads txt

Triple Lift Direct

Triple Lift Direct Usage Statistics · Download List of All Websites using Triple Lift Direct

Website is a direct publisher for Triple Lift ad content.

ads txt

Inventory Partner Domain

Inventory Partner Domain Usage Statistics · Download List of All Websites using Inventory Partner Domain

Inventory sharing allows inventory publishers to share monetization rights for ad inventory with multiple partners through distribution agreements.

ads txt

Wurl

Wurl Usage Statistics · Download List of All Websites using Wurl

Wurl, owned by AppLovin, helps content publishers and streamers reach global viewers, maximize revenues, grow viewership, and enhance brand value in the CTV industry.

Digital Video Ads

comScore Activation

comScore Activation Usage Statistics · Download List of All Websites using comScore Activation

comScore Activation helps digital publishers build more valuable targets.

Sellers Json

Sellers Json Usage Statistics · Download List of All Websites using Sellers Json

Sellers.json is a tool designed to help buyers identify the direct sellers and intermediaries involved in digital advertising sales. This website is listed in a sellers.json.

ads txt · Seller JSON

Sellers Json Intermediary

Sellers Json Intermediary Usage Statistics · Download List of All Websites using Sellers Json Intermediary

Listed as an intermediary of digital advertising content.

Sellers Json Publisher

Sellers Json Publisher Usage Statistics · Download List of All Websites using Sellers Json Publisher

Listed as a publisher of digital advertising content.

Glewed Media Publisher

Glewed Media Publisher Usage Statistics · Download List of All Websites using Glewed Media Publisher

GlewedTV by Glewed Media offers engaging content for viewers to enjoy.

Seller JSON

Fomo TV Publisher

Fomo TV Publisher Usage Statistics · Download List of All Websites using Fomo TV Publisher

Fomo TV is a free VOD service with movies, TV series, sports docs, crime stories, and reality shows.

Seller JSON

⊡ Fomo TV Publisher

Fomo TV Publisher Usage Statistics · Download List of All Websites using Fomo TV Publisher

Fomo TV is a free VOD service with movies, TV series, sports docs, crime stories, and reality shows.
Seller JSON

🌐 Mediasense Group Publisher

Mediasense Group Publisher Usage Statistics · Download List of All Websites using Mediasense Group Publisher

Mediasense Group offers media monitoring and analysis services for businesses.
Seller JSON

Verified Link   View Global Trends

🐦 Twitter

Twitter Usage Statistics · Download List of All Websites using Twitter
The website mentions twitter.com in some form.

ⓕ Facebook

Facebook Usage Statistics · Download List of All Websites using Facebook
The website mentions facebook.com in some form.

🎵 TikTok

TikTok Usage Statistics · Download List of All Websites using TikTok
The website mentions tiktok.com (but not Douyin) in some form.

📷 Instagram

Instagram Usage Statistics · Download List of All Websites using Instagram
The website mentions Instagram in some form.

◯ GitHub

GitHub Usage Statistics · Download List of All Websites using GitHub
The website mentions github.com in some form.

⬤ SEC EDGAR 10-K

SEC EDGAR 10-K Usage Statistics · Download List of All Websites using SEC EDGAR 10-K
A 10-K is an annual filing with the SEC required by publicly-traded companies that contains detailed information about their financial performance. It provides more detail than an annual report, which is sent out to shareholders ahead of an annual meeting

G Google Play Store Link

Google Play Store Link Usage Statistics · Download List of All Websites using Google Play Store Link
Links to a Game/Movie/App/Book on the Google Play Store.

🔧 Gambling Content

Gambling Content Usage Statistics · Download List of All Websites using Gambling Content
When we index the internet we come across a lot of random websites. A lot of them are landing pages for some form of gambling content. This technology tracks keywords like Casino and Baccarat on the homepage of websites and well as domain blocking hosts.
Adult

▶ YouTube Link

YouTube Link Usage Statistics · Download List of All Websites using YouTube Link
This website mentions YouTube.com on it in some form or another.

Web Hosting Providers   View Global Trends

☁ Amazon Elastic Load Balancing

Amazon Elastic Load Balancing Usage Statistics · Download List of All Websites using Amazon Elastic Load Balancing

aws Amazon Elastic Load Balancing

Amazon Elastic Load Balancing Usage Statistics · Download List of All Websites using Amazon Elastic Load Balancing

Elastic Load Balancing automatically distributes incoming application traffic across multiple Amazon EC2 instances in the cloud.

Cloud PaaS

aws Amazon

Amazon Usage Statistics · Download List of All Websites using Amazon

This site is hosted on Amazon AWS EC2 Infrastructure.

Cloud Hosting · Cloud PaaS

aws Amazon Virginia Region

Amazon Virginia Region Usage Statistics · Download List of All Websites using Amazon Virginia Region
Amazon Hosted EC2 Instances in Virginia

☁ Cloudflare Hosting

Cloudflare Hosting Usage Statistics · Download List of All Websites using Cloudflare Hosting

Supercharged web hosting service.

US hosting · Cloud Hosting · Cloud PaaS

⟨ Akamai Hosted

Akamai Hosted Usage Statistics · Download List of All Websites using Akamai Hosted

Data network CDN provider.

US hosting

G Google

Google Usage Statistics · Download List of All Websites using Google

Site hosted on Google infrastructure.

Cloud PaaS · Indian hosting

G Google Cloud

Google Cloud Usage Statistics · Download List of All Websites using Google Cloud

Website hosted on Google Cloud Platform - includes Google Compute Engine.

Cloud Hosting · Indian hosting

G Google Cloud Global Multi-Region

Google Cloud Global Multi-Region Usage Statistics · Download List of All Websites using Google Cloud Global Multi-Region
Google Cloud IPs tagged as 'Global' by Google.

⌗ 403 Error

403 Error Usage Statistics · Download List of All Websites using 403 Error

The website returned a 403 Forbidden error message and wasn't identified as parked at the time. This does not mean we are not able to index technologies.

Email Hosting Providers   View Global Trends

⧖ Zendesk

Zendesk Usage Statistics · Download List of All Websites using Zendesk

Organize, prioritize and engage with others on support requests.

ⅿ Mimecast

Mimecast Usage Statistics · Download List of All Websites using Mimecast

Cloud services for Microsoft Exchange designed to remove risk, lower costs and help businesses make sense of their email data.

Business Email Hosting

aws Amazon SES

Amazon SES Usage Statistics · Download List of All Websites using Amazon SES

Amazon Simple Email Service (Amazon SES) is a scalable, bulk, transactional email-sending service for businesses and developers.

Transactional Email

⬛ Sophos

Amazon Simple Email Service (Amazon SES) is a scalable, bulk, transactional email-sending service for businesses and developers.
Transactional Email

Sophos

Sophos Usage Statistics · Download List of All Websites using Sophos
End point security systems.
Secure Email

SPF

SPF Usage Statistics · Download List of All Websites using SPF
The Sender Policy Framework is an open standard specifying a technical method to prevent sender address forgery.

DMARC

DMARC Usage Statistics · Download List of All Websites using DMARC
A technical specification created by a group of organizations that want to help reduce the potential for email-based abuse
DMARC

DMARC Quarantine

DMARC Quarantine Usage Statistics · Download List of All Websites using DMARC Quarantine
The domain has a DMARC policy of 'Quarantine'. This tells the receiving mail server that all emails that do not have your domain name in the "From" field (or any other set criteria) should be quarantined by default.

DMARC Analyzer

DMARC Analyzer Usage Statistics · Download List of All Websites using DMARC Analyzer
Mimecast owned DMARC analyzing solution.
DMARC

Apple iCloud Mail

Apple iCloud Mail Usage Statistics · Download List of All Websites using Apple iCloud Mail
Webmail service provided by Apple.

Name Server   View Global Trends

Ireland Domain Redirect

Ireland Domain Redirect Usage Statistics · Download List of All Websites using Ireland Domain Redirect
A website having a domain redirect from .ie (Ireland) could be considered a premium business as .ie domain registrations must show either a presence in Ireland, a WIPO registered trademark or significant business from Ireland.

3 to 9 ccTLD Redirects

3 to 9 ccTLD Redirects Usage Statistics · Download List of All Websites using 3 to 9 ccTLD Redirects
The domain has had between 3 and 9 redirects from other ccTLDs within the same root domain name.
TLD Redirects

Akamai DNS

Akamai DNS Usage Statistics · Download List of All Websites using Akamai DNS
DNS services provided by Akamai.

SSL Certificates   View Global Trends

GoDaddy SSL

GoDaddy SSL Usage Statistics · Download List of All Websites using GoDaddy SSL
Certificate provided by GoDaddy.
Root Authority

SSL by Default

SSL by Default Usage Statistics · Download List of All Websites using SSL by Default
The website redirects traffic to an HTTPS/SSL version by default.

Certificate provided by GoDaddy.

Root Authority

SSL by Default

SSL by Default Usage Statistics · Download List of All Websites using SSL by Default
The website redirects traffic to an HTTPS/SSL version by default.

LetsEncrypt

LetsEncrypt Usage Statistics · Download List of All Websites using LetsEncrypt
Let's Encrypt is a free open Certificate Authority.
Root Authority

HSTS

HSTS Usage Statistics · Download List of All Websites using HSTS
Forces browsers to only communicate with the site using HTTPS.

Web Servers   View Global Trends

nginx

nginx Usage Statistics · Download List of All Websites using nginx
nginx [engine x] is a HTTP server and mail proxy server written by Igor Sysoev.

Apache

Apache Usage Statistics · Download List of All Websites using Apache
Apache has been the most popular web server on the Internet since April 1996.

NCSA HTTPd

NCSA HTTPd Usage Statistics · Download List of All Websites using NCSA HTTPd
NCSA HTTPd is an HTTP/1.0 compatible server for making hypertext and other documents available to Web browsers.Site's reporting its use may be purposely misleadingLarge sites reporting using PWS may be purposely misleading.

Operating Systems and Servers   View Global Trends

IPv6

IPv6 Usage Statistics · Download List of All Websites using IPv6
The website has an IPv6 record.

Verified CDN   View Global Trends

Akamai Edge

Akamai Edge Usage Statistics · Download List of All Websites using Akamai Edge
Akamai's Edge Platform is one of the world's largest distributed computing platforms. It is a network of more than 95,000 secure servers equipped with proprietary software and deployed in 71 countries.
Edge Delivery Network

Akamai EdgeWorkers

Akamai EdgeWorkers Usage Statistics · Download List of All Websites using Akamai EdgeWorkers
Akamai content transformation at Edge.

Content Delivery Network   View Global Trends

Content Delivery Network

Content Delivery Network Usage Statistics · Download List of All Websites using Content Delivery Network
This page contains links that give the impression that some of the site contents are stored on a content delivery network.

Web Master Registration   View Global Trends

Apache

Apache Usage Statistics · Download List of All Websites using Apache
Apache has been the most popular web server on the Internet since April 1996.

NCSA HTTPd

NCSA HTTPd Usage Statistics · Download List of All Websites using NCSA HTTPd
NCSA HTTPd is an HTTP/1.0 compatible server for making hypertext and other documents available to Web browsers.Site's reporting its use may be purposely misleadingLarge sites reporting using PWS may be purposely misleading.

Operating Systems and Servers   View Global Trends

IPv6

IPv6 Usage Statistics · Download List of All Websites using IPv6
The website has an IPv6 record.

Verified CDN   View Global Trends

Akamai Edge

Akamai Edge Usage Statistics · Download List of All Websites using Akamai Edge
Akamai's Edge Platform is one of the world's largest distributed computing platforms. It is a network of more than 95,000 secure servers equipped with proprietary software and deployed in 71 countries.
Edge Delivery Network

Akamai EdgeWorkers

Akamai EdgeWorkers Usage Statistics · Download List of All Websites using Akamai EdgeWorkers
Akamai content transformation at Edge.

Content Delivery Network   View Global Trends

Content Delivery Network

Content Delivery Network Usage Statistics · Download List of All Websites using Content Delivery Network
This page contains links that give the impression that some of the site contents are stored on a content delivery network.

Web Master Registration   View Global Trends

Google Webmaster

Google Webmaster Usage Statistics · Download List of All Websites using Google Webmaster
Webmaster tools provide you with a free and easy way to make your site more Google-friendly.

BuiltWith® Pty Ltd
Level 35
One International Towers
100 Barangaroo Avenue
Sydney NSW 2000
Australia

US: 650 618 3949
AU: 1300 558 745
support@builtwith.com

Products
Technology Lookup
Technology Trends
Product Finder
eCommerce Lists
Product Lists
Keyword Lists
Top Sites
LeadsDiscovery
LeadsEye™

Plans & Pricing
Sign Up · Login

Features
Lead Generation
Market Analysis
Sales Intelligence
Future Customers
Cyber Risk Auditing
Alternative Data
Report Filtering
Global Data
Coverage
All Features · Use Cases
Screencast Demo

Resources
Knowledge Base
Exportable Fields
Screencast
Customers
FAQ
Blog
About Us
Contact Us
Affiliates

API Access
Datasets
Browser Extensions
CRM Integrations

Removals
Terms of Use · Privacy Policy
Modern Slavery

𝕏 in 0 ♪ ⑥ V ⓞ ⑥

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Exhibit 48

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Amazon Q   Products   Solutions   Pricing   Documentation   Learn   Partner Network   AWS Marketplace   Customer Enablement   Events   Explo

AWS Customer Agreement

**For additional information related to each AWS Contracting Party, see the AWS Contracting Party FAQs.

*Please note that as of January 1, 2024, customers located in Türkiye contract with our Türkiye based AWS Contracting Party, as provided in Section 12. See the AWS Turkey FAQs for more information.

Last Updated: December 23, 2024

See What's Changed

This AWS Customer Agreement (this "**Agreement**") contains the terms and conditions that govern your access to and use of the Services (as defined below) and is an agreement between the applicable AWS Contracting Party specified in Section 12 below (also referred to as "**AWS**," "**we**," "**us**," or "**our**") and you or the entity you represent ("**you**" or "**your**"). This Agreement takes effect when you click an "I Accept" button or check box presented with these terms or, if earlier, when you use any of the Services (the "**Effective Date**"). You represent to us that you are lawfully able to enter into contracts (e.g., you are not a minor). If you are entering into this Agreement for an entity, such as the company you work for, you represent to us that you have legal authority to bind that entity. Please see Section 12 for definitions of certain capitalized terms used in this Agreement.

1. AWS Responsibilities

1.1 General. You may access and use the Services in accordance with this Agreement. Service Level Agreements and Service Terms apply to certain Services.

1.2 Third-Party Content. Third-Party Content may be used by you at your election. Third-Party Content is governed by this Agreement and, if applicable, separate terms and conditions accompanying such Third-Party Content, which terms and conditions may include separate fees and charges.

1.3 AWS Security. Without limiting Section 8 or your obligations under Section 2.2, we will implement reasonable and appropriate measures designed to help you secure Your Content against accidental or unlawful loss, access or disclosure.

1.4 Data Privacy. You may specify the AWS regions in which Your Content will be stored. You consent to the storage of Your Content in, and transfer of Your Content into, the AWS regions you select. We will not access or use Your Content except as necessary to maintain or provide the Services, or as necessary to comply with the law or a binding order of a governmental body. We will not (a) disclose Your Content to any government or third party or (b) move Your Content from the AWS regions selected by you; except in each case as necessary to comply with the law or a binding order of a governmental body. Unless it would violate the law or a binding order of a governmental body, we will give you notice of any legal requirement or order referred to in this Section 1.4. We will only use your Account Information in accordance with the Privacy Notice, and you consent to such usage. The Privacy Notice does not apply to Your Content.

1.5 Notice of Changes to the Services. We may change or discontinue any of the Services from time to time. We will provide you at least 12 months' prior notice before discontinuing a material functionality of a Service that we make generally available to customers and that you are using. AWS will not be obligated to provide such notice under this Section 1.5 if the discontinuation is necessary to (a) address an emergency, or risk of harm to the Services or AWS, (b) respond to claims, litigation, or loss of license rights related to third party intellectual property rights, or (c) comply with law, but should any of the preceding occur AWS will provide you with as much prior notice as is reasonably practicable under the circumstances.

1.6 Notice of Changes to the Service Level Agreements. We may change, discontinue or add Service Level Agreements, provided, however, that we will provide at least 90 days' advance notice for adverse changes to any Service Level Agreement.

2. Your Responsibilities.

2.1 Your Accounts. You will comply with the terms of this Agreement and all laws, rules and regulations applicable to your use of the Services. To access the Services, you must have an AWS account associated with a valid email address and a valid form of payment. Unless explicitly permitted by the Service Terms, you will only create one account per email address. Except to the extent caused by our breach of this Agreement, (a) you are responsible for all activities that occur under your account, regardless of whether the activities are authorized by you or undertaken by you, your employees or a third party (including your contractors, agents or End Users), and (b) we and our affiliates are not responsible for unauthorized access to your account.

2.2 Your Content. You are responsible for Your Content. You will ensure that Your Content and your and End Users' use of Your Content or the Services will not violate any of the Policies or any applicable law.

aws About AWS Contact Us Support ▾ English ▾ My Account ▾ Sign In Create an AWS Account

Case 3:25-cv-01143-GC-JTQ   Document 1-4   Filed 02/10/25   Page 113 of 131 PageID: 880

Amazon Q   Products   Solutions   Pricing   Documentation   Learn   Partner Network   AWS Marketplace   Customer Enablement   Events   Explo ❯ 🔍

2.2 Your Content. You are responsible for Your Content. You will ensure that Your Content and your and End Users' use of Your Content or the Services will not violate any of the Policies or any applicable law.

2.3 Your Security and Backup. You are responsible for properly configuring and using the Services and otherwise taking appropriate action to secure, protect and backup your accounts and Your Content in a manner that will provide appropriate security and protection, which might include use of encryption to protect Your Content from unauthorized access and routinely archiving Your Content.

2.4 Log-In Credentials and Account Keys. AWS log-in credentials and private keys generated by the Services are for your internal use only and you will not sell, transfer or sublicense them to any other entity or person, except that you may disclose your private key to your agents and subcontractors performing work on your behalf.

2.5 End Users. You will be deemed to have taken any action that you permit, assist or facilitate any person or entity to take related to this Agreement, Your Content or use of the Services. You are responsible for End Users' use of Your Content and the Services, and for their compliance with your obligations under this Agreement. If you become aware of any violation of your obligations under this Agreement caused by an End User, you will immediately suspend access to Your Content and the Services by such End User. We do not provide any support or services to End Users unless we have a separate agreement with you or an End User obligating us to provide such support or services.

3. Fees and Payment.

3.1 Service Fees. We calculate and bill fees and charges monthly. We may bill you more frequently for fees accrued if we reasonably suspect that your account is fraudulent or at risk of non-payment. You will pay us the applicable fees and charges for use of the Services as described on the AWS Site using one of the payment methods we support. All amounts payable by you under this Agreement will be paid to us without setoff or counterclaim, and without any deduction or withholding. Fees and charges for any new Service or new feature of a Service will be effective when we post updated fees and charges on the AWS Site, unless we expressly state otherwise in a notice. We may increase or add new fees and charges for any existing Services you are using by giving you at least 30 days' prior notice. We may elect to charge you interest at the rate of 1.5% per month (or the highest rate permitted by law, if less) on all late payments. If we suspend your account under Section 4.1 or terminate your use of the Services pursuant to Section 5.2(b)(ii), we may elect not to bill you for fees and charges after suspension unless your account is reinstated.

3.2 Taxes.

(a) Each party will be responsible, as required under applicable law, for identifying and paying all taxes and other governmental fees and charges (and any penalties, interest, and other additions thereto) that are imposed on that party upon or with respect to the transactions and payments under this Agreement. All fees payable by you are exclusive of Indirect Taxes, except where applicable law requires otherwise. We may charge and you will pay applicable Indirect Taxes that we are legally obligated or authorized to collect from you. You will provide such information to us as reasonably required to determine whether we are obligated to collect Indirect Taxes from you. We will not collect, and you will not pay, any Indirect Tax for which you furnish us a properly completed exemption certificate or a direct payment permit certificate for which we can claim an available exemption from such Indirect Tax. All payments made by you to us under this Agreement will be made free and clear of any deduction or withholding, as required by law. If any such deduction or withholding (including cross-border withholding taxes) is required on any payment, you will pay such additional amounts as are necessary so that the net amount received by us is equal to the amount then due and payable under this Agreement. We will provide you with such tax forms as are reasonably requested in order to reduce or eliminate the amount of any withholding or deduction for taxes in respect of payments made under this Agreement.

(b) If the applicable AWS Contracting Party is Amazon Web Services India Private Limited ("AWS India") (formerly known as Amazon Internet Services Private Limited), the parties agree that the provisions of this Section 3.2(b) will apply.

You acknowledge that AWS India may display the applicable fees and charges for the Services on the Site in USD (or such other currency as AWS India may deem fit). However, AWS India will invoice you in INR calculated and converted in accordance with the conversion rate determined by us on the date of invoice ("INR Equivalent Fees"). You will only be liable to pay the INR Equivalent Fees indicated in each invoice.

We will invoice you from our registered office at the address of your establishment (as registered with the tax authorities, if applicable) receiving the Services in accordance with the applicable indirect tax laws.

All fees and charges payable under this Agreement will be exclusive of applicable national, state or local indirect taxes ("Taxes") that AWS India is legally obligated to charge under applicable law. For the purpose of this clause, local indirect taxes include Goods and Services Tax ("GST"), which includes the Central Goods and Services Tax ("CGST"), the State Goods and Services Tax ("SGST"), the Union Territory Goods and Services Tax ("UGST"), the Integrated Goods and Services Tax ("IGST") as may be applicable. The Taxes charged by AWS India will be stated in the invoice pursuant to applicable laws. AWS India may charge and you will pay any applicable Taxes, which are stated separately on the invoice. As per the statutory requirement under GST, you will provide all necessary information such as the correct GST registered address, legal name and GSTIN ("GST Information") in order for AWS India to issue correct GST invoices as per the applicable legal requirements. In the event, the GST invoice is incorrect, you will inform us in a timely manner, to enable AWS India to correct the GST tax invoice. AWS India will determine the place of supply for the Services based on the GST Information provided by you and accordingly, charge GST (CGST and SGST/UTGST or IGST) on its invoice. Any withholding taxes that may be applicable to the fees and charges payable to us are for our account. You will pay the fees and charges in our invoice in full (gross) without applying any withholding taxes. If you separately deposit applicable withholding taxes on such fees and charges to the applicable government treasury and issue us a withholding tax certificate evidencing such deposit, following receipt of the withholding tax certificate in original form, we will reimburse to you an amount equal to the taxes that are evidenced as deposited.

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fees and charges to the applicable government treasury and issue us a withholding tax certificate evidencing such deposit, following receipt of the withholding tax certificate in original form, we will reimburse to you an amount equal to the taxes that are evidenced as deposited.

4. Temporary Suspension.

4.1 Generally. We may suspend your or any End User's right to access or use any portion or all of the Services immediately upon notice to you if we reasonably determine:

(a) your or an End User's use of the Services (i) poses a security risk to the Services or any third party, (ii) could adversely impact our systems, the Services or the systems or Content of any other AWS customer, (iii) could subject us, our affiliates, or any third party to liability, or (iv) could be fraudulent;

(b) you are, or any End User is, in material breach of this Agreement;

(c) you are in breach of your payment obligations under Section 3; or

(d) you have ceased to operate in the ordinary course, made an assignment for the benefit of creditors or similar disposition of your assets, or become the subject of any bankruptcy, reorganization, liquidation, dissolution or similar proceeding.

4.2 Effect of Suspension. If we suspend your right to access or use any portion or all of the Services:

(a) you will be responsible for all fees and charges you incur during the period of suspension that we bill to you; and

(b) you will not be entitled to any service credits under the Service Level Agreements for any period of suspension.

5. Term; Termination.

5.1 Term. The term of this Agreement will commence on the Effective Date and will remain in effect until terminated under this Section 5. Any notice of termination of this Agreement by either party to the other must include a Termination Date that complies with the notice periods in Section 5.2.

5.2 Termination.

(a) Termination for Convenience. You may terminate this Agreement for any reason by providing us notice and closing your account for all Services for which we provide an account closing mechanism. We may terminate this Agreement for any reason by providing you at least 30 days' advance notice.

(b) Termination for Cause.

(i) By Either Party. Either party may terminate this Agreement for cause if the other party is in material breach of this Agreement and the material breach remains uncured for a period of 30 days from receipt of notice by the other party. No later than the Termination Date, you will close your account.

(ii) By Us. We may also terminate this Agreement immediately upon notice to you:

(A) for cause if we have the right to suspend under Section 4 and the issue giving us the right to suspend either:

a. is not capable of being remedied; or

b. has not been remedied within 30 days of us suspending your service under Section 4.1;

(B) if our relationship with a third-party partner who provides software or other technology we use to provide the Services expires, terminates or requires us to change the way we provide the software or other technology as part of the Services; or

(C) in order to comply with the law or requests of governmental entities.

5.3 Effect of Termination.

(a) Generally. Upon the Termination Date:

(i) except as provided in Sections 5.3(a)(iv) and 5.3(b), all your rights under this Agreement immediately terminate;

(ii) you remain responsible for all fees and charges you have incurred through the Termination Date and are responsible for any fees and charges you incur during the post-termination period described in Section 5.3(b) that we bill to you;

(iii) you will immediately return or, if instructed by us, destroy all AWS Content in your possession; and

(iii) you will immediately return or, if instructed by us, destroy all AWS Content in your possession; and

(iv) Sections 2.1, 3, 5.3, 6 (except Section 6.3), 7, 8, 9, 11 and 12 will continue to apply in accordance with their terms.

(b) Post-Termination. Unless we terminate your use of the Services pursuant to Section 5.2(b), during the 30 days following the Termination Date:

(i) we will not take action to remove from the AWS systems any of Your Content as a result of the termination; and

(ii) we will allow you to retrieve Your Content from the Services only if you have paid all amounts due under this Agreement.

For any use of the Services after the Termination Date, the terms of this Agreement will apply and you will pay the applicable fees at the rates under Section 3.

6. Proprietary Rights.

6.1 Your Content. Except as provided in this Section 6, we obtain no rights under this Agreement from you (or your licensors) to Your Content. You consent to our use of Your Content to provide the Services to you and any End Users.

6.2 Adequate Rights. You represent and warrant to us that: (a) you or your licensors own all right, title, and interest in and to Your Content and Suggestions; (b) you have all rights in Your Content and Suggestions necessary to grant the rights contemplated by this Agreement; and (c) none of Your Content or End Users' use of Your Content or the Services will violate the Acceptable Use Policy.

6.3 Intellectual Property License. The Intellectual Property License applies to your use of AWS Content and the Services.

6.4 Restrictions. Neither you nor any End User will use the AWS Content or Services in any manner or for any purpose other than as expressly permitted by this Agreement. Neither you nor any End User will, or will attempt to (a) reverse engineer, disassemble, or decompile the Services or AWS Content or apply any other process or procedure to derive the source code of any software included in the Services or AWS Content (except to the extent applicable law doesn't allow this restriction), (b) access or use the Services or AWS Content in a way intended to avoid incurring fees or exceeding usage limits or quotas, or (c) resell the Services or AWS Content. The AWS Trademark Guidelines apply to your use of the AWS Marks. You will not misrepresent or embellish the relationship between us and you (including by expressing or implying that we support, sponsor, endorse, or contribute to you or your business endeavors). You will not imply any relationship or affiliation between us and you except as expressly permitted by this Agreement.

6.5 Suggestions. If you provide any Suggestions to us or our affiliates, we and our affiliates will be entitled to use the Suggestions without restriction. You hereby irrevocably assign to us all right, title, and interest in and to the Suggestions and agree to provide us any assistance we require to document, perfect, and maintain our rights in the Suggestions.

7. Indemnification.

7.1 General. You will defend, indemnify, and hold harmless us, our affiliates and licensors, and each of their respective employees, officers, directors, and representatives from and against any Losses arising out of or relating to any third-party claim concerning: (a) your or any End Users' use of the Services (including any activities under your AWS account and use by your employees and personnel); (b) breach of this Agreement or violation of applicable law by you, End Users or Your Content; or (c) a dispute between you and any End User. You will reimburse us for reasonable attorneys' fees, as well as our employees' and contractors' time and materials spent responding to any third party subpoena or other compulsory legal order or process associated with third party claims described in (a) through (c) above at our then-current hourly rates.

7.2 Intellectual Property.

(a) Subject to the limitations in this Section 7, AWS will defend you and your employees, officers, and directors against any third-party claim alleging that the Services infringe or misappropriate that third party's intellectual property rights, and will pay the amount of any adverse final judgment or settlement.

(b) Subject to the limitations in this Section 7, you will defend AWS, its affiliates, and their respective employees, officers, and directors against any third-party claim alleging that any of Your Content infringes or misappropriates that third party's intellectual property rights, and will pay the amount of any adverse final judgment or settlement.

(c) Neither party will have obligations or liability under this Section 7.2 arising from infringement by combinations of the Services or Your Content, as applicable, with any other product, service, software, data, content or method. In addition, AWS will have no obligations or liability arising from your or any End User's use of the Services after AWS has notified you to discontinue such use. The remedies provided in this Section 7.2 are the sole and exclusive remedies for any third-party claims of infringement or misappropriation of intellectual property rights by the Services or by Your Content.

(d) For any claim covered by Section 7.2(a), AWS will, at its election, either: (i) procure the rights to use that portion of the Services alleged to be infringing; (ii) replace the alleged infringing portion of the Services with a non-infringing alternative; (iii) modify the alleged infringing portion of the Services to make it non-infringing; or (iv) terminate the allegedly infringing portion of the Services or this Agreement.

7.3 Process. The obligations under this Section 7 will apply only if the party seeking defense or indemnity: (a) gives the other party prompt written notice of the claim; (b) permits the other party to control the defense and settlement of the claim; and (c) reasonably cooperates with the other party (at the other party's expense) in the defense and settlement of the

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the allegedly infringing portion of the Services or this Agreement.

7.3 Process. The obligations under this Section 7 will apply only if the party seeking defense or indemnity: (a) gives the other party prompt written notice of the claim; (b) permits the other party to control the defense and settlement of the claim; and (c) reasonably cooperates with the other party (at the other party's expense) in the defense and settlement of the claim. In no event will a party agree to any settlement of any claim that involves any commitment, other than the payment of money, without the written consent of the other party.

8. Disclaimers.

THE SERVICES AND AWS CONTENT ARE PROVIDED "AS IS." EXCEPT TO THE EXTENT PROHIBITED BY LAW, OR TO THE EXTENT ANY STATUTORY RIGHTS APPLY THAT CANNOT BE EXCLUDED, LIMITED OR WAIVED, WE AND OUR AFFILIATES AND LICENSORS (A) MAKE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY OR OTHERWISE REGARDING THE SERVICES OR AWS CONTENT OR THE THIRD-PARTY CONTENT, AND (B) DISCLAIM ALL WARRANTIES, INCLUDING ANY IMPLIED OR EXPRESS WARRANTIES (I) OF MERCHANTABILITY, SATISFACTORY QUALITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT, OR QUIET ENJOYMENT, (II) ARISING OUT OF ANY COURSE OF DEALING OR USAGE OF TRADE, (III) THAT THE SERVICES OR AWS CONTENT OR THIRD-PARTY CONTENT WILL BE UNINTERRUPTED, ERROR FREE OR FREE OF HARMFUL COMPONENTS, AND (IV) THAT ANY CONTENT WILL BE SECURE OR NOT OTHERWISE LOST OR ALTERED.

9. Limitations of Liability.

9.1 Liability Disclaimers. EXCEPT FOR PAYMENT OBLIGATIONS UNDER SECTION 7, NEITHER AWS NOR YOU, NOR ANY OF THEIR AFFILIATES OR LICENSORS, WILL HAVE LIABILITY TO THE OTHER UNDER ANY CAUSE OF ACTION OR THEORY OF LIABILITY, EVEN IF A PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH LIABILITY, FOR (A) INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES, (B) THE VALUE OF YOUR CONTENT, (C) LOSS OF PROFITS, REVENUES, CUSTOMERS, OPPORTUNITIES, OR GOODWILL, OR (D) UNAVAILABILITY OF THE SERVICES OR AWS CONTENT (THIS DOES NOT LIMIT ANY SERVICE CREDITS UNDER SERVICE LEVEL AGREEMENTS).

9.2 Damages Cap. EXCEPT FOR PAYMENT OBLIGATIONS UNDER SECTION 7, THE AGGREGATE LIABILITY UNDER THIS AGREEMENT OF EITHER AWS OR YOU, AND ANY OF THEIR RESPECTIVE AFFILIATES OR LICENSORS, WILL NOT EXCEED THE AMOUNTS PAID BY YOU TO AWS UNDER THIS AGREEMENT FOR THE SERVICES THAT GAVE RISE TO THE LIABILITY DURING THE 12 MONTHS BEFORE THE LIABILITY AROSE; EXCEPT THAT NOTHING IN THIS SECTION 9 WILL LIMIT YOUR OBLIGATION TO PAY AWS FOR YOUR USE OF THE SERVICES PURSUANT TO SECTION 3, OR ANY OTHER PAYMENT OBLIGATIONS UNDER THIS AGREEMENT.

10. Modifications to the Agreement.

We may modify this Agreement (including any Policies) at any time by posting a revised version on the AWS Site or by otherwise notifying you in accordance with Section 11.10. The modified terms will become effective upon posting or, if we notify you by email, as stated in the email message. By continuing to use the Services or AWS Content after the effective date of any modifications to this Agreement, you agree to be bound by the modified terms. It is your responsibility to check the AWS Site regularly for modifications to this Agreement. We last modified this Agreement on the date listed at the beginning of this Agreement.

11. Miscellaneous.

11.1 Assignment. You will not assign or otherwise transfer this Agreement or any of your rights and obligations under this Agreement, without our prior written consent. Any assignment or transfer in violation of this Section 11.1 will be void. We may assign this Agreement without your consent (a) in connection with a merger, acquisition or sale of all or substantially all of our assets, or (b) to any affiliate or as part of a corporate reorganization; and effective upon such assignment, the assignee is deemed substituted for AWS as a party to this Agreement and AWS is fully released from all of its obligations and duties to perform under this Agreement. Subject to the foregoing, this Agreement will be binding upon, and inure to the benefit of the parties and their respective permitted successors and assigns.

11.2 Entire Agreement. This Agreement incorporates the Policies by reference and is the entire agreement between you and us regarding the subject matter of this Agreement. This Agreement supersedes all prior or contemporaneous representations, understandings, agreements, or communications between you and us, whether written or verbal, regarding the subject matter of this Agreement (but does not supersede prior commitments to purchase Services such as Amazon EC2 Reserved Instances). None of the parties will be bound by any term, condition or other provision that is different from or in addition to the provisions of this Agreement (whether or not it would materially alter this Agreement) including for example, any term, condition or other provision (a) submitted by you in any order, receipt, acceptance, confirmation, correspondence or other document, (b) related to any online registration, response to any Request for Bid, Request for Proposal, Request for Information, or other questionnaire, or (c) related to any invoicing process that you submit or require us to complete. If the terms of this document are inconsistent with the terms contained in any Policy, the terms contained in this document will control, except that the Service Terms will control over this document.

11.3 Force Majeure. Except for payment obligations, neither party nor any of their affiliates will be liable for any delay or failure to perform any obligation under this Agreement where the delay or failure results from any cause beyond its reasonable control, including acts of God, labor disputes or other industrial disturbances, electrical or power outages, utilities or other telecommunications failures, earthquake, storms or other elements of nature, blockages, embargoes, riots, acts or orders of government, acts of terrorism, or war.

11.4 Governing Law. The Governing Laws, without reference to conflict of law rules, govern this Agreement and any dispute of any sort that might arise between you and us. The United Nations Convention for the International Sale of Goods does not apply to this Agreement.

11.5 Disputes. Any dispute or claim relating in any way to your use of the Services, or to any products or services sold or distributed by AWS will be adjudicated in the Governing Courts, and you consent to exclusive jurisdiction and venue in the Governing Courts, subject to the additional provisions below.

11.5 Disputes. Any dispute or claim relating in any way to your use of the Services, or to any products or services sold or distributed by AWS will be adjudicated in the Governing Courts, and you consent to exclusive jurisdiction and venue in the Governing Courts, subject to the additional provisions below.

(a) If the applicable AWS Contracting Party is Amazon Web Services, Inc., Amazon Web Services Canada, Inc., Amazon Web Services Korea LLC or Amazon Web Services Singapore Private Limited, the parties agree that the provisions of this Section 11.5(a) will apply. Disputes will be resolved by binding arbitration, rather than in court, except that either party may elect to proceed in small claims court if your claims qualify. The Federal Arbitration Act and federal arbitration law apply to this Agreement, except that if Amazon Web Services Canada, Inc. is the applicable AWS Contracting Party the Ontario Arbitration Act will apply to this Agreement. There is no judge or jury in arbitration, and court review of an arbitration award is limited. However, an arbitrator can award the same damages and relief as a court (including injunctive and declaratory relief or statutory damages), and must follow the terms of this Agreement as a court would. Before you may begin an arbitration proceeding, you must send a letter notifying us of your intent to pursue arbitration and describing your claim to our registered agent Corporation Service Company, 300 Deschutes Way SW, Suite 304, Tumwater, WA 98501. The arbitration will be conducted by the American Arbitration Association (AAA) under its commercial rules, which are available at www.adr.org or by calling 1-800-778-7879. Payment of filing, administration and arbitrator fees will be governed by the AAA commercial fee schedule. We and you agree that any dispute resolution proceedings will be conducted only on an individual basis and not in a class, consolidated or representative action. We and you further agree that the underlying award in arbitration may be appealed pursuant to the AAA's Optional Appellate Arbitration Rules. If for any reason a claim proceeds in court rather than in arbitration we and you waive any right to a jury trial. Notwithstanding the foregoing we and you both agree that you or we may bring suit in court to enjoin infringement or other misuse of intellectual property rights.

(b) If the applicable AWS Contracting Party is Amazon Web Services South Africa Proprietary Limited, the parties agree that the provisions of this Section 11.5(b) will apply. Disputes will be resolved by arbitration in accordance with the then-applicable rules of the Arbitration Foundation of Southern Africa, and judgment on the arbitral award must be entered in the Governing Court. The Arbitration Act, No. 42 of 1965 applies to this Agreement. The arbitration will take place in Johannesburg. There will be three arbitrators. The fees and expenses of the arbitrators and the administering authority, if any, will be paid in equal proportion by the parties.

(c) If the applicable AWS Contracting Party is Amazon AWS Serviços Brasil Ltda., the parties agree that the provisions of this Section 11.5(c) will apply. Disputes will be resolved by binding arbitration, rather than in court, in accordance with the then-applicable Rules of Arbitration of the International Chamber of Commerce, and judgment on the arbitral award may be entered in any court having jurisdiction. The arbitration will take place in the City of São Paulo, State of São Paulo, Brazil. There will be three arbitrators. The fees and expenses of the arbitrators and the administering authority, if any, will be paid in equal proportion by the parties. The parties agree that the existence of and information relating to any such arbitration proceedings will not be disclosed by either party and will constitute confidential information. The Governing Courts will have exclusive jurisdiction for the sole purposes of (i) ensuring the commencement of the arbitral proceedings; and (ii) granting conservatory and interim measures prior to the constitution of the arbitral tribunal.

(d) If the applicable AWS Contracting Party is Amazon Web Services Australia Pty Ltd, the parties agree that the provisions of this Section 11.5(d) will apply. Disputes will be resolved by arbitration administered by the Australian Center for International Commercial Arbitration ("ACICA") in accordance with the then-applicable ACICA Arbitration Rules, and judgment on the arbitral award may be entered in any court having jurisdiction. The arbitration will take place in Sydney, Australia. There will be three arbitrators. The fees and expenses of the arbitrators and the administering authority, if any, will be paid in equal proportion by the parties. The parties agree that the existence of and information relating to any such arbitration proceedings will not be disclosed by either party and will constitute confidential information.

(e) If the applicable AWS Contracting Party is Amazon Web Services New Zealand Limited, the parties agree that the provisions of this Section 11.5(e) will apply. Disputes will be resolved by arbitration administered by the New Zealand Dispute Resolution Centre ("NZDRC") in accordance with the then-applicable Arbitration Rules of NZDRC, and judgment on the arbitral award may be entered in any court having jurisdiction. The arbitration will take place in Auckland, New Zealand. There will be three arbitrators. The fees and expenses of the arbitrators and the administering authority, if any, will be paid in equal proportion by the parties. The parties agree that the existence of and information relating to any such arbitration proceedings will not be disclosed by either party and will constitute confidential information.

(f) If the applicable AWS Contracting Party is Amazon Web Services Malaysia Sdn. Bhd. (Registration No. 201501028710 (1154031-W)), the parties agree that the provisions of this Section 11.5(f) will apply. Disputes will be resolved by arbitration administered by the Singapore International Arbitration Centre ("SIAC") in accordance with the then-applicable Arbitration Rules of SIAC, and judgment on the arbitral award may be entered in any court having jurisdiction. The arbitration will take place in Singapore. There will be three arbitrators. The fees and expenses of the arbitrators and the administering authority, if any, will be paid in equal proportion by the parties. The parties agree that the existence of and information relating to any such arbitration proceedings will not be disclosed by either party and will constitute confidential information.

(g) If the applicable AWS Contracting Party is AWS India, the parties agree that the provisions of this Section 11.5(g) will apply. Disputes will be resolved by binding arbitration, rather than in court. Arbitration will be conducted by a panel consisting of three (3) arbitrators, with one (1) nominated by each party and the third chosen by the two (2) arbitrators so nominated. The decision and award will be determined by the majority of the panels and shall be final and binding upon the parties. The arbitration will be conducted in accordance with the provisions of the Arbitration and Conciliation Act, 1996 of India, as may be in force from time to time. The arbitration proceedings will be conducted in English, and the seat of the arbitration will be New Delhi. The cost of the arbitration, including fees and expenses of the arbitrator, shall be shared equally by the parties, unless the award otherwise provides. The courts at New Delhi shall have the exclusive jurisdiction for all arbitral applications. The Parties agree that the existence of and information relating to any such arbitration proceedings will not be disclosed by either party. Notwithstanding the foregoing, any party may seek injunctive relief in any court of competent jurisdiction for any actual or alleged infringement of such party's, its affiliates' or any third party's intellectual property or other proprietary rights.

(h) If the applicable AWS Contracting Party is AWS Turkey Pazarlama Teknoloji ve Danışmanlık Hizmetleri Limited Şirketi, the parties agree that the provisions of this Section 11.5(h) will apply. Disputes will be resolved by arbitration administered by the International Chamber of Commerce International Court of Arbitration (the "ICC Court") in accordance with the then-applicable arbitration rules (the "ICC Rules").The arbitration proceedings will be conducted in English, and the seat of arbitration will be Zurich. There

(h) If the applicable AWS Contracting Party is AWS Turkey Pazarlama Teknoloji ve Danışmanlık Hizmetleri Limited Şirketi, the parties agree that the provisions of this Section 11.5(h) will apply. Disputes will be resolved by arbitration administered by the International Chamber of Commerce International Court of Arbitration (the "ICC Court") in accordance with the then-applicable arbitration rules (the "ICC Rules").The arbitration proceedings will be conducted in English, and the seat of arbitration will be Zurich. There will be three arbitrators. Each party will appoint one arbitrator in accordance with the ICC Rules. Within 30 days of the appointment of the co-arbitrators, the two appointed arbitrators will appoint the third arbitrator as the president of the arbitral tribunal. If the twoappointed arbitrators fail to appoint a third arbitrator as the president within such 30 day period, then the ICC Court will appoint the president. The parties agree that the existence of and information relating to any such arbitration proceedings will not be disclosed by either party and will constitute confidential information.

11.6 Trade Compliance. In connection with this Agreement, each party will comply with all applicable import, re-import, sanctions, anti-boycott, export, and re-export control laws and regulations, including all such laws and regulations that apply to a U.S. company, such as the Export Administration Regulations, the International Traffic in Arms Regulations, and economic sanctions programs implemented by the Office of Foreign Assets Control. For clarity, you are solely responsible for compliance related to the manner in which you choose to use the Services or AWS Content, including your transfer and processing of Your Content, the provision of Your Content to End Users, and the AWS region in which any of the foregoing occur. You represent and warrant that you and your financial institutions, or any party that owns or controls you or your financial institutions, are not subject to sanctions or otherwise designated on any list of prohibited or restricted parties, including but not limited to the lists maintained by the United Nations Security Council, the U.S. Government (e.g., the Specially Designated Nationals List and Foreign Sanctions Evaders List of the U.S. Department of Treasury, and the Entity List of the U.S. Department of Commerce), the European Union or its Member States, or other applicable government authority.

11.7 Independent Contractors; Non-Exclusive Rights. We and you are independent contractors, and this Agreement will not be construed to create a partnership, joint venture, agency, or employment relationship. Neither party, nor any of their respective affiliates, is an agent of the other for any purpose or has the authority to bind the other. Both parties reserve the right (a) to develop or have developed for it products, services, concepts, systems, or techniques that are similar to or compete with the products, services, concepts, systems, or techniques developed or contemplated by the other party, and (b) to assist third party developers or systems integrators who may offer products or services which compete with the other party's products or services.

11.8 Language. All communications and notices made or given pursuant to this Agreement must be in the English language. If we provide a translation of the English language version of this Agreement, the English language version of the Agreement will control if there is any conflict.

11.9 Confidentiality and Publicity. You may use AWS Confidential Information only in connection with your use of the Services or AWS Content as permitted under this Agreement. You will not disclose AWS Confidential Information during the Term or at any time during the 5-year period following the end of the Term. You will take all reasonable measures to avoid disclosure, dissemination or unauthorized use of AWS Confidential Information, including, at a minimum, those measures you take to protect your own confidential information of a similar nature. You will not issue any press release or make any other public communication with respect to this Agreement or your use of the Services or AWS Content.

11.10 Notice.

(a) To You. We may provide any notice to you under this Agreement by:

(i) posting a notice on the AWS Site; or

(ii) sending a message to the email address then associated with your account.

Notices we provide by posting on the AWS Site will be effective upon posting and notices we provide by email will be effective when we send the email. It is your responsibility to keep your email address current. You will be deemed to have received any email sent to the email address then associated with your account when we send the email, whether or not you actually receive the email.

(b) To Us. To give us notice under this Agreement, you must contact AWS by facsimile transmission or personal delivery, overnight courier or registered or certified mail to the facsimile number or mailing address, as applicable, listed for the applicable AWS Contracting Party in Section 12 below. We may update the facsimile number or address for notices to us by posting a notice on the AWS Site. Notices provided by personal delivery will be effective immediately. Notices provided by facsimile transmission or overnight courier will be effective one business day after they are sent. Notices provided registered or certified mail will be effective three business days after they are sent.

11.11 No Third-Party Beneficiaries. Except as set forth in Section 7, this Agreement does not create any third-party beneficiary rights in any individual or entity that is not a party to this Agreement.

11.12 U.S. Government Rights. The Services and AWS Content are provided to the U.S. Government as "commercial items," "commercial computer software," "commercial computer software documentation," and "technical data" with the same rights and restrictions generally applicable to the Services and AWS Content. If you are using the Services and AWS Content on behalf of the U.S. Government and these terms fail to meet the U.S. Government's needs or are inconsistent in any respect with federal law, you will immediately discontinue your use of the Services and AWS Content. The terms "commercial item" "commercial computer software," "commercial computer software documentation," and "technical data" are defined in the Federal Acquisition Regulation and the Defense Federal Acquisition Regulation Supplement.

11.13 No Waivers. The failure by us to enforce any provision of this Agreement will not constitute a present or future waiver of such provision nor limit our right to enforce such provision at a later time. All waivers by us must be in writing to be effective.

11.13 No Waivers. The failure by us to enforce any provision of this Agreement will not constitute a present or future waiver of such provision nor limit our right to enforce such provision at a later time. All waivers by us must be in writing to be effective.

11.14 Severability. If any portion of this Agreement is held to be invalid or unenforceable, the remaining portions of this Agreement will remain in full force and effect. Any invalid or unenforceable portions will be interpreted to effect and intent of the original portion. If such construction is not possible, the invalid or unenforceable portion will be severed from this Agreement but the rest of the Agreement will remain in full force and effect.

11.15 Account Country Specific Terms. You agree to the following modifications to the Agreement that apply to your AWS Contracting Party as described below:

(a) If the applicable AWS Contracting Party is Amazon Web Services Australia Pty Ltd, the parties agree as follows:

(i) If the Services are subject to any statutory guarantees under the Australian Competition and Consumer Act 2010, then to the extent that any part of this Agreement is unenforceable under such Act, you agree that a fair and reasonable remedy to you will be limited to, at our election, either: (i) supplying the Services again; or (ii) paying for the cost of having the Services supplied again.

(ii) If this Agreement is a "consumer contract" or "small business contract" as defined in the Australian Competition and Consumer Act 2010:

a. Section 7.1 will not apply to the extent the applicable Losses or damages are caused by AWS's gross negligence or criminal misconduct. For these purposes, "gross negligence" means an act or omission by an employee who has authority to bind AWS that is negligent and a wilful and significant disregard of an obvious and material risk.

b. If we are required to give prior notice under Section 1.5 or Section 3, we will give you this notice by email or a reasonably substitutable alternative means. If we modify this Agreement under Section 10 in a way that is materially adverse to you (as reasonably determined by AWS), we will give you at least 30 days' prior notice of the modification by email or a reasonably substitutable alternative means.

(b) If the applicable AWS Contracting Party is Amazon Web Services Japan G.K., the parties agree as follows:

(i) The following sentence is added at the end of Section 6.5 (Suggestions):

"The foregoing assignment includes the assignment of the rights provided under Article 27 (Rights of Translation, Adaptation, etc.) and Article 28 (Right of the Original Author in the Exploitation of a Derivative Work) of the Copyright Act of Japan, and you agree not to exercise your moral rights against us, our affiliates or persons who use the Suggestions through the consent of us or our affiliates."

(ii) The following sentences are added at the end of Section 9 (Limitation of Liability):

"THE DISCLAIMER OR THE DAMAGES CAP IN THIS SECTION MAY NOT BE APPLIED TO DAMAGES CAUSED BY EITHER PARTY'S GROSS NEGLIGENCE OR WILLFUL MISCONDUCT IF SUCH DISCLAIMER OR THE DAMAGES CAP ARE DEEMED AGAINST PUBLIC POLICY UNDER ARTICLE 90 OF THE CIVIL CODE. IN THAT EVENT, THE SCOPE OF THE DISCLAIMER SHALL BE NARROWLY CONSTRUED IN SUCH MANNER AND THE DAMAGES CAP MAY BE INCREASED BY SUCH MINIMUM AMOUNT SO THAT THE DISCLAIMER OR THE DAMAGES CAP HEREUNDER WOULD NOT BE DEEMED AGAINST PUBLIC POLICY UNDER ARTICLE 90 OF THE CIVIL CODE."

(c) If the applicable AWS Contracting Party is AWS Turkey Pazarlama Teknoloji ve Danışmanlık Hizmetleri Limited Şirketi, the parties agree as follows:

(i) The following sentence is added at the end of Section 3.2(a) (Taxes):

"If we are required to pay any stamp tax in relation to this Agreement or any other document related to this Agreement, we may charge you and you will pay us 50% of the amounts of any stamp tax paid by us."

(d) If the applicable AWS Contracting Party is Amazon Web Services Malaysia Sdn. Bhd., the parties agree as follows:

Section 9.1 (Liability Disclaimers) is deleted and replaced with the following:

"9.1 Liability Disclaimers. EXCEPT FOR PAYMENT OBLIGATIONS UNDER SECTION 7, NEITHER AWS NOR YOU, NOR ANY OF THEIR AFFILIATES OR LICENSORS, WILL HAVE LIABILITY TO THE OTHER UNDER ANY CAUSE OF ACTION OR THEORY OF LIABILITY, EVEN IF A PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH LIABILITY, FOR (A) INDIRECT, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES, (B) THE VALUE OF YOUR CONTENT, (C) LOSS OF PROFITS, REVENUES, CUSTOMERS, OPPORTUNITIES, OR GOODWILL, OR (D) UNAVAILABILITY OF THE SERVICES OR AWS CONTENT (THIS DOES NOT LIMIT ANY SERVICE CREDITS UNDER SERVICE LEVEL AGREEMENTS)."

12. Definitions.

"Acceptable Use Policy" means the policy located at http://aws.amazon.com/aup (and any successor or related locations designated by us), as may be updated by us from time to time.

"Acceptable Use Policy" means the policy located at http://aws.amazon.com/aup (and any successor or related locations designated by us), as may be updated by us from time to time.

"Account Country" is the country associated with your account. If you have provided a valid tax registration number for your account, then your Account Country is the country associated with your tax registration. If you have not provided a valid tax registration, then your Account Country is the country where your billing address is located, except if you have a credit card associated with your AWS account that is issued in a different country and your contact address is also in that country, then your Account Country is that different country.

"Account Information" means information about you that you provide to us in connection with the creation or administration of your AWS account. For example, Account Information includes names, usernames, phone numbers, email addresses and billing information associated with your AWS account.

"API" means an application program interface.

"AWS Confidential Information" means all nonpublic information disclosed by us, our affiliates, business partners, or our or their respective employees, contractors or agents that is designated as confidential or that, given the nature of the information or circumstances surrounding its disclosure, reasonably should be understood to be confidential. AWS Confidential Information includes: (a) nonpublic information relating to our or our affiliates or business partners' technology, customers, business plans, promotional and marketing activities, finances and other business affairs; (b) third-party information that we are obligated to keep confidential; and (c) the nature, content and existence of any discussions or negotiations between you and us or our affiliates. AWS Confidential Information does not include any information that: (i) is or becomes publicly available without breach of this Agreement; (ii) can be shown by documentation to have been known to you at the time of your receipt from us; (iii) is received from a third party who did not acquire or disclose the same by a wrongful or tortious act; or (iv) can be shown by documentation to have been independently developed by you without reference to the AWS Confidential Information.

"AWS Content" means APIs, WSDLs, sample code, software libraries, command line tools, proofs of concept, templates, advice, information, programs (including credit programs) and any other Content made available by us and our affiliates related to use of the Services or on the AWS Site and other related technology (including any of the foregoing that are provided by our personnel). AWS Content does not include the Services or Third-Party Content.

"AWS Contracting Party" means the party identified in the table below, based on your Account Country. If you change your Account Country to one that is identified with a different AWS Contracting Party, you agree that the AWS Contracting Party identified with your new Account Country is your AWS Contracting Party, without any further action required by either party.

Account Country	AWS Contracting Party	Facsimile	Mailing Address
Australia	Amazon Web Services Australia Pty Ltd (ABN: 63 605 345 891)	N/A	Level 37, 2-26 Park Street, Sydney, NSW, 2000, Australia
Brazil*	Amazon AWS Serviços Brasil Ltda.	N/A	A. Presidente Juscelino Kubitschek, 2.041, Torre E - 18th and 19th Floors, Vila Nova Conceicao, São Paulo, Brasil
Canada	Amazon Web Services Canada, Inc.	N/A	120 Bremner Blvd, 26th Floor, Toronto, Ontario, M5J 0A8, Canada
India	Amazon Web Services India Private Limited (formerly known as Amazon Internet Services Private Limited), having its registered office at Unit Nos. 1401 to 1421 International Trade Tower, Nehru Place, New Delhi 110019, India	011-47985609	Unit Nos. 1401 to 1421 International Trade Tower, Nehru Place, Delhi 110019, India.
Japan	Amazon Web Services Japan G.K.	N/A	1-1, Kamiosaki 3-chome, Shinagawa-ku, Tokyo, 141-0021, Japan
Malaysia	Amazon Web Services Malaysia Sdn. Bhd. (Registration No. 201501028710 (1154031-W))	N/A	Level 26 & Level 35, The Gardens North Tower, Lingkaran Syed Putra, Mid Valley City, Kuala Lumpur, 59200, Malaysia
New Zealand	Amazon Web Services New Zealand Limited	N/A	Level 5, 18 Viaduct Harbour Ave, Auckland, 1010, New Zealand

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New Zealand	Amazon Web Services New Zealand Limited	N/A	Level 5, 18 Viaduct Harbour Ave, Auckland, 1010, New Zealand
Singapore	Amazon Web Services Singapore Private Limited	N/A	Level 2, East Tower, 2 Central Boulevard, IOI Central Boulevard Towers, Singapore 018916
South Africa	Amazon Web Services South Africa Proprietary Limited	206-266-7010	Wembley Square 2, 134 Solan Road, Gardens, Cape Town, 8001, South Africa
South Korea	Amazon Web Services Korea LLC	N/A	L12, East tower, 231, Teheran-ro, Gangnam-gu, Seoul, 06142, Republic of Korea
Türkiye	AWS Turkey Pazarlama Teknoloji ve Danışmanlık Hizmetleri Limited Şirketi	N/A	Esentepe Mahallesi Bahar Sk. Özdilek/River Plaza/Wyndham Grand Hotel Apt. No: 13/52 Şişli, Istanbul, 34394, Türkiye
Any country within Europe, the Middle East, or Africa (excluding South Africa) ("EMEA")**	Amazon Web Services EMEA SARL	352 2789 0057	38 Avenue John F. Kennedy, L-1855, Luxembourg
Any country that is not listed in this table above.	Amazon Web Services, Inc.	206-266-7010	410 Terry Avenue North, Seattle, WA 98109-5210 U.S.A.

*Brazil is your Account Country only if you have provided a valid Brazilian Tax Registration Number (CPF/CNPJ number) for your account. If your billing address is located in Brazil but you have not provided a valid Brazilian Tax Registration Number (CPF/CNPJ number), then Amazon Web Services, Inc. is the AWS Contracting Party for your account.

**See https://aws.amazon.com/legal/aws-emea-countries for a full list of EMEA countries.

"AWS Marks" means any trademarks, service marks, service or trade names, logos, and other designations of AWS and its affiliates that we may make available to you in connection with this Agreement.

"AWS Site" means http://aws.amazon.com (and any successor or related locations designated by us), as may be updated by us from time to time.

"AWS Trademark Guidelines" means the guidelines and trademark license located at http://aws.amazon.com/trademark-guidelines/ (and any successor or related locations designated by us), as may be updated by us from time to time.

"Content" means software (including machine images), data, text, audio, video, or images.

"End User" means any individual or entity that directly or indirectly through another user (a) accesses or uses Your Content, or (b) otherwise accesses or uses the Services under your account. The term "End User" does not include individuals or entities when they are accessing or using the Services or any Content under their own AWS account, rather than under your account.

"Governing Laws" and "Governing Courts" mean, for each AWS Contracting Party, the laws and courts set forth in the following table:

AWS Contracting Party	Governing Laws	Governing Courts
Amazon AWS Serviços Brasil Ltda	The laws of Brazil	The courts of the City of São Paulo, State of São Paulo
Amazon Web Services Australia Pty Ltd (ABN: 63 605 345 891)	The laws of New South Wales	The courts of New South Wales
Amazon Web Services Canada, Inc.	The laws of the Province of Ontario, Canada and federal laws of Canada applicable therein	The provincial or federal courts located in Toronto, Ontario, Canada

Amazon Web Services Canada, Inc.	The laws of the Province of Ontario, Canada and Federal laws of Canada applicable therein	The provincial or Federal court is located in Toronto, Ontario, Canada
Amazon Web Services EMEA SARL	The laws of the Grand Duchy of Luxembourg	The courts in the district of Luxembourg City
Amazon Web Services, Inc.	The laws of the State of Washington	The state or Federal courts in King County, Washington
Amazon Web Services India Private Limited (AWS India)	The laws of India	The courts in New Delhi, India
Amazon Web Services Japan G.K.	The laws of Japan	The Tokyo District Court
Amazon Web Services Korea LLC	The laws of the State of Washington	The state or Federal courts in King County, Washington
Amazon Web Services Malaysia Sdn. Bhd. (Registration No. 201501028710 (1154031-W))	The laws of Malaysia	The courts of Malaysia
Amazon Web Services New Zealand Limited	The laws of New Zealand	The courts of New Zealand
Amazon Web Services Singapore Private Limited	The laws of the State of Washington	The state or Federal courts in King County, Washington
Amazon Web Services South Africa Proprietary Limited	The laws of the Republic of South Africa	The South Gauteng High Court, Johannesburg
AWS Turkey Pazarlama Teknoloji ve Danışmanlık Hizmetleri Limited Şirketi	The laws of the Grand Duchy of Luxembourg	The courts in the district of Luxembourg City

"Indirect Taxes" means applicable taxes and duties, including, without limitation, VAT, service tax, GST, excise taxes, sales and transactions taxes, and gross receipts tax.

"Intellectual Property License" means the separate license terms that apply to your access to and use of AWS Content and Services located at https://aws.amazon.com/legal/aws-ip-license-terms (and any successor or related locations designated by us), as may be updated by us from time to time.

"Losses" means any claims, damages, losses, liabilities, costs, and expenses (including reasonable attorneys' fees).

"Policies" means the Acceptable Use Policy, Privacy Notice, the Site Terms, the Service Terms, and the AWS Trademark Guidelines.

"Privacy Notice" means the privacy notice located at http://aws.amazon.com/privacy (and any successor or related locations designated by us), as may be updated by us from time to time.

"Service" means each of the services made available by us or our affiliates, including those web services described in the Service Terms. Services do not include Third-Party Content.

"Service Level Agreement" means all service level agreements that we offer with respect to the Services and post on the AWS Site, as they may be updated by us from time to time. The service level agreements we offer with respect to the Services are located at https://aws.amazon.com/legal/service-level-agreements/ (and any successor or related locations designated by us), as may be updated by us from time to time.

"Service Terms" means the rights and restrictions for particular Services located at http://aws.amazon.com/serviceterms (and any successor or related locations designated by us), as may be updated by us from time to time.

"Site Terms" means the terms of use of the AWS Site located at http://aws.amazon.com/terms/ (and any successor or related locations designated by us), as may be updated by us from time to time.

"Suggestions" means all suggested improvements to the Services or AWS Content that you provide to us.

"Term" means the term of this Agreement described in Section 5.1.

"Termination Date" means the effective date of termination provided in a notice from one party to the other in accordance with Section 5.

"Third-Party Content" means Content made available to you by any third party on the AWS Site or in conjunction with the Services.

"Privacy Notice" means the privacy notice located at http://aws.amazon.com/privacy (and any successor or related locations designated by us), as may be updated by us from time to time.

"Service" means each of the services made available by us or our affiliates, including those web services described in the Service Terms. Services do not include Third-Party Content.

"Service Level Agreement" means all service level agreements that we offer with respect to the Services and post on the AWS Site, as they may be updated by us from time to time. The service level agreements we offer with respect to the Services are located at https://aws.amazon.com/legal/service-level-agreements/ (and any successor or related locations designated by us), as may be updated by us from time to time.

"Service Terms" means the rights and restrictions for particular Services located at http://aws.amazon.com/serviceterms (and any successor or related locations designated by us), as may be updated by us from time to time.

"Site Terms" means the terms of use of the AWS Site located at http://aws.amazon.com/terms/ (and any successor or related locations designated by us), as may be updated by us from time to time.

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"Termination Date" means the effective date of termination provided in a notice from one party to the other in accordance with Section 5.

"Third-Party Content" means Content made available to you by any third party on the AWS Site or in conjunction with the Services.

"Your Content" means Content that you or any End User transfers to us for processing, storage or hosting by the Services in connection with your AWS account and any computational results that you or any End User derive from the foregoing through their use of the Services. For example, Your Content includes Content that you or any End User stores in Amazon Simple Storage Service. Your Content does not include Account Information.

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What is Generative AI?
What is Machine Learning (ML)?
AWS Cloud Security
What's New
Blogs
Press Releases

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Training and Certification
AWS Solutions Library
Architecture Center
Product and Technical FAQs
Analyst Reports
AWS Partners

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Security, Identity, and Compliance › Compliance › Data Privacy

Data Privacy FAQs

- Commitments
- FAQs
- Resources

Commitments

At AWS, customer trust is our top priority.

Maintaining customer trust is an ongoing commitment. AWS continually monitors the evolving privacy regulatory and legislative landscape to identify changes and determine what tools our customers might need to meet their compliance goals. We strive to inform you of the privacy and data security policies, practices, and technologies we've put in place.

Our commitments include:

- **Access:** As a customer, you maintain full control of your content that you upload to the AWS services under your AWS account, and responsibility for configuring access to AWS services and resources. We provide an advanced set of access, encryption, and logging features to help you do this effectively (e.g., AWS Identity and Access Management, AWS Organizations and AWS CloudTrail). We also provide APIs for you to configure access control permissions for any of the services you develop or deploy in an AWS environment. We do not access or use your content for any purpose without your agreement. We do not use your content or derive information from it for marketing or advertising purposes.

- **Storage:** You choose the AWS Region(s) in which your content is stored. You can replicate and back up your content in more than one AWS Region. We will not move or replicate your content outside of your chosen AWS Region(s) without your agreement.

- **Security:** You choose how your content is secured. We offer you industry-leading encryption features to protect your content in transit and at rest, and we provide you with the option to manage your own encryption keys. These data protection features include:

  - Data encryption capabilities available in over 100 AWS services.

  - Flexible key management options using AWS Key Management Service (KMS), allowing customers to choose whether to have AWS manage their encryption keys or keep complete control over their keys.

  - Security assurance program, using best practices for security and data protection to help you operate securely within AWS, and to make the best use of our security control environment. These security protections and control processes are independently validated by multiple third-party independent assessments.

- **Disclosure of customer content**: We will not disclose customer content (see How does AWS classify customer information? below) unless we're required to do so to comply with the law or a valid and binding order of a government body. If a governmental body sends AWS a demand for your customer content, we will attempt to redirect the governmental body to request that data directly from you. If compelled to disclose your customer content to a government body, we will give you reasonable notice of the demand to allow you to seek a protective order or other appropriate remedy unless AWS is legally prohibited from doing so.

FAQs

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‹ **Commitments**

FAQs

Resources

What is customer content?

We define customer content as software (including machine images), data, text, audio, video, or images that a customer or any end user transfers to us for processing, storage, or hosting by AWS services in connection with a customer's account, and any computational results that a customer or their end user derives from the foregoing through their use of AWS services. For example, customer content includes content that a customer or their end user stores in Amazon Simple Storage Service (S3). Customer content does not include account information, which we describe below. Customer content also does not include information included in resource identifiers, metadata tags, access controls, rules, usage policies, permissions, and similar items related to the management of AWS resources. AWS recommends that you do not include personally identifying, confidential, or sensitive information in these items. The terms of the AWS Customer Agreement and the AWS Service Terms apply to your customer content.

What is account information?

We define account information as information about a customer that a customer provides to us in connection with the creation or administration of a customer account. For example, account information includes names, usernames, phone numbers, email addresses, and billing information associated with a customer account. The information practices described in the AWS Privacy Notice apply to account information.

Who owns customer content?

As a customer, you own your customer content, and you select which AWS services can process, store, and host your customer content. We do not access or use your customer content for any purpose without your agreement. We do not use customer content or derive information from it for marketing or advertising.

Who controls customer content?

As a customer, you control your content:

- You determine the geographic region where your customer content will be stored and the type of storage.
- You choose the secured state of your customer content. We offer you industry-leading encryption features to protect your content in transit and at rest, and we provide you with the option to manage your own encryption keys.
- You manage access to your customer content, and access to AWS services and resources through users, groups, permissions, and credentials that you control.

How do you use my account information?

The AWS Privacy Notice describes how we collect and use account information.

How does AWS use information included in resource identifiers and other items related to the management of AWS resources?

AWS uses that information to provide the AWS services, and to protect and improve the customer experience. For example, AWS uses resource identifiers to help customers generate cost and usage reports, which can be used to break down AWS spend by cost center, and IAM permissions to determine whether a specific user can purchase reserved instances. When customers contact AWS for technical assistance, AWS may also analyze resource identifiers and permissions to help resolve their issues.

What happens when AWS receives a legal request for customer content?

We are vigilant about our customers' privacy. We will not disclose customer content unless we're required to do so to comply with the law or a valid and binding order of a governmental body. If a governmental body sends AWS a demand for customer content, we will attempt to redirect the governmental body to request that data directly from the customer. Governmental and regulatory bodies need to follow the applicable legal process to obtain valid and binding orders. We review all orders and object to overbroad or otherwise inappropriate ones. If compelled to disclose customer content to a government body, we will give customers reasonable notice of the demand to allow the customer to seek a protective order or other appropriate remedy unless AWS is legally prohibited from doing so. It is also important to point out that our customers can encrypt their customer content, and we provide customers with the option to manage their own encryption keys.

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‹ **Commitments**

  FAQs

  Resources

We know that transparency matters to our customers, so we regularly publish a report about the types and volume of information requests we receive on the Amazon Information Requests webpage.

Where is customer content stored?

The AWS Global Infrastructure gives you the flexibility to choose where and how you want to run your workloads using the same network, control plane, APIs, and AWS services. If you would like to run your applications globally you can choose from any of the AWS Regions and Availability Zones. As a customer, you choose the AWS Region(s) in which your customer content is stored, allowing you to deploy AWS services in the location(s) of your choice, in accordance with your specific geographic requirements. For example, if an AWS customer in Australia wants to store their data only in Australia, they can choose to deploy their AWS services exclusively in the Asia Pacific (Sydney) AWS Region. If you want to discover other flexible storage options see the AWS Regions webpage.

You can also replicate and back up your customer content in more than one AWS Region. We will not move or replicate your content outside of your chosen AWS Region(s), except as necessary to provide the services you initiated, or as necessary to comply with the law or a binding order of a governmental body. However, it is important to note that some AWS services may not be available in all AWS Regions. For more information about which services are available in which AWS Regions, see the AWS Regional Services webpage.

What is my role in securing my content?

When evaluating the security of a cloud solution, it is important for you to understand and distinguish between the security of the cloud, and your security in the cloud. Security of the cloud encompasses the security measures that AWS implements and operates. We are responsible for security of the cloud. Security in the cloud encompasses the security measures that you implement and operate, related to the AWS services you use. You are responsible for your security in the cloud. For more information, see the AWS Shared Responsibility webpage.

What step does AWS take to protect my privacy?

At AWS, our highest priority is securing our customers' data, and we implement rigorous contractual, technical, and organizational measures to protect data confidentiality, integrity, and availability regardless of which AWS Region a customer has selected.

AWS complies with ISO 27018, a code of practice that focuses on protection of personal data in the cloud. It extends ISO information security standard 27001 to cover the regulatory requirements for the protection of personally identifiable information (PII) or personal data for the public cloud computing environment and specifies implementation guidance based on ISO 27002 controls that is applicable to PII processed by public cloud service providers. For more information, or to view the AWS ISO 27018 Certification, see the AWS ISO 27018 Compliance webpage.

Additionally, AWS publishes a SOC 2 Type II Privacy report, based on the SOC 2 Privacy Trust Criteria developed by the American Institute of CPAs (AICPA), which establishes criteria for evaluating controls related to how personal data is collected, used, retained, disclosed, and disposed to meet the entity's objectives. The AWS SOC 2 Type II Privacy report provides third-party attestation of our systems and the suitability of the design of our privacy controls. The scope of the privacy report includes information about how we handle the content that you upload to AWS and how it is protected in all of the services and locations that are in scope for the latest AWS SOC reports. The SOC 2 Type II Privacy report can be downloaded through AWS Artifact in the AWS Management Console.

Who should I contact if I have questions regarding AWS and data protection?

We recommend that customers with questions regarding AWS and data protection contact their AWS account manager. If customers have signed up for Enterprise Support, they can also reach out to their Technical Account Manager (TAM) for support. AWS account managers and TAMs work with Solutions Architects to help customers meet their compliance needs. AWS can't provide legal advice to customers, and we recommend that customers consult their legal counsel if they have legal questions regarding data protection.

We also have teams of Enterprise Support Representatives, Professional Services Consultants, and other staff to help with privacy questions. You can contact us with questions here.

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Exhibit 50

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WinView Intellectual Property

Market Environment Overview

Television is a large and evolving $300 billion industry including $70 billion in commercial advertising. The consensus of broadcasters, programmers, advertisers and set manufacturers is that the enhancement of television content and the viewer experience will be increasingly driven by combining television's unique ability to reach tens of millions of viewers via one-to-all broadcasts with the real-time, individual targeting, and two-way communications capabilities of the connected digital world. These enhancements require the use of ubiquitous two-way communications capability for each individual viewer- the "second screen[1] "

Whether a TV viewer is watching a program as it is broadcast, DVR taped or streamed, the personalized, two-way information sent to and from the programmer, broadcaster, and advertiser, to each viewer's second screen must specifically relate to the programming being watched. If not, it creates unrelated, second-screen multitasking — the primary cause of distraction and inattention to TV programming and advertising. To present anything on the second screen not directly related to the telecast defeats the goal of expanding and enhancing the viewer's experience and value to the sponsors and programmers.

WinView's Patents are Foundational to Interactive Television Engagement

WinView's 24 issued and 15 pending patents fully cover the methods, systems, and devices that match the flow of information to and from the viewer's second screen related to the specific program they are currently watching. The WinView patents are therefore **foundational** to potential monetization flowing from real-time, two-way second-screen interaction.

Interactive Second Screen & Sports Gaming Portfolio

WinView's issued or "allowed" patents cover but are not limited to the following:

1. The synchronization of a second-screen with a live televised sports event for purposes of playing a game of skill or a game of chance (called In-Play or In-Game betting) an existing $12 billion business just on mobile devices today outside the U.S.

8,149,530; 8,717,701; 8,837,072; 8,705,195; 8,817,408; 8,837,072; 8,817,408

2. The synchronization of the second screen with a pre-recorded television program (i.e. all non-live programing) for any purpose. Second screen synchronization is presently being done by every broadcast, satellite, and major cable network. This includes companion "tell me more" information, polls, games, i.e. anything related to the telecast:

8,717,701 ; 8,699,168; 8,705,195; 8,659,848; 8,737,004

3. The synchronization of the second screen with TV commercials for any purpose such as targeting a companion video, providing more information, the awarding of points or prizes, coupons, asking questions, generating leads, etc. This Advanced Advertising segment is projected by Merrill Lynch to be a $14 billion segment:

8,149,530; 8,717,701; 8,699,168; 8,705,195; 8,659,848; 8,737,0048,659,848; 8,780,482

The patents cover 2 and 3 above when automatic content recognition (ACR) is utilized when watching a taped telecast on a DVR.

8,717,701 ; 8,699,168; 8,659,848; 8,705,195;

4. All of the above are covered when ACR is utilized by a "smart TV" including the use of the TV screen itself or a Wi-Fi connected second screen. Last year there were three million Smart TV sets sold with ACR capability, projected at 48 million ACR enabled smart TV's in three years. (Parks Associates) 8,717,701 ; 8,699,168; 8,659,848

During games of skill or contests, joining friends through any means such as Facebook, Twitter, ad hoc groups, existing fantasy leagues, etc., into separate contests based on the score achieved in common legal games of skill played with televised sports.

8,002,618; 8,622,798; 13/246,464 (NOA)

The entry of a score achieved in a game of skill based on a televised sport in a separate "for pay" prize pool where the entry fees are dispersed to the pool participant winners, less a management fee. This is

of expanding and enhancing the viewer's experience and value to the sponsors and programmers.

WinView's Patents are Foundational to Interactive Television Engagement

WinView's 24 issued and 15 pending patents fully cover the methods, systems, and devices that match the flow of information to and from the viewer's second screen related to the specific program they are currently watching. The WinView patents are therefore **foundational** to potential monetization flowing from real-time, two-way second-screen interaction.

Interactive Second Screen & Sports Gaming Portfolio

WinView's issued or "allowed" patents cover but are not limited to the following:

1. The synchronization of a second-screen with a live televised sports event for purposes of playing a game of skill or a game of chance (called In-Play or In-Game betting) an existing $12 billion business just on mobile devices today outside the U.S.

8,149,530; 8,717,701; 8,837,072; 8,705,195; 8,817,408; 8,837,072; 8,817,408

2. The synchronization of the second screen with a pre-recorded television program (i.e. all non-live programing) for any purpose. Second screen synchronization is presently being done by every broadcast, satellite, and major cable network. This includes companion "tell me more" information, polls, games, i.e. anything related to the telecast:

8,717,701 ; 8,699,168; 8,705,195; 8,659,848; 8,737,004

3. The synchronization of the second screen with TV commercials for any purpose such as targeting a companion video, providing more information, the awarding of points or prizes, coupons, asking questions, generating leads, etc. This Advanced Advertising segment is projected by Merrill Lynch to be a $14 billion segment:

8,149,530; 8,717,701; 8,699,168; 8,705,195; 8,659,848; 8,737,0048,659,848; 8,780,482

The patents cover 2 and 3 above when automatic content recognition (ACR) is utilized when watching a taped telecast on a DVR.

8,717,701 ; 8,699,168; 8,659,848; 8,705,195;

4. All of the above are covered when ACR is utilized by a "smart TV" including the use of the TV screen itself or a Wi-Fi connected second screen. Last year there were three million Smart TV sets sold with ACR capability, projected at 48 million ACR enabled smart TV's in three years. (Parks Associates) 8,717,701 ; 8,699,168; 8,659,848

During games of skill or contests, joining friends through any means such as Facebook, Twitter, ad hoc groups, existing fantasy leagues, etc., into separate contests based on the score achieved in common legal games of skill played with televised sports.

8,002,618; 8,622,798; 13/246,464 (NOA)

The entry of a score achieved in a game of skill based on a televised sport in a separate "for pay" prize pool where the entry fees are dispersed to the pool participant winners, less a management fee. This is legal in 36 states covering 80% of the U.S. population where games based "predominately on skill" are legal. 8,002,618; 8,622,798; 13/246,464 (NOA)

5. The format described above to any game of skill played on a mobile device, computer or game console. Example Deer Hunter, Candy Crush, word, dice, and trivia games or any casual game where the participants play the identical game at the same time. 8,002,618; 8,622,798. According to Frank N. Magid Associates (May 2014), 8% of the U.S. population currently is generating $2.5 billion in skill games, concluding this market will grow by more than 40% year over year reaching $9 billion by 2017.

[1] "Second Screen" includes any internet connected device such as smart phones, tablets, smart TVs, and web connected DVR's, all specifically covered by the patents.